Southern California's Computer Magazine
May 17, 1993 • #109
FREE

MicroTimes™

An Interview With Author Brenda Laurel

"My issue with 'interface' is that it's all predicated on the notion that the relationship is between the user and the computer. I don't think it's true. If you believed a similar thing about films, we would go see projectors instead of movies."

Redefining Our Relationship To Computers

NEW SECTION INSIDE!

MultiMedia & Beyond

In This Issue:
Amiga Recording Studio:
Viewpoints From The Pros

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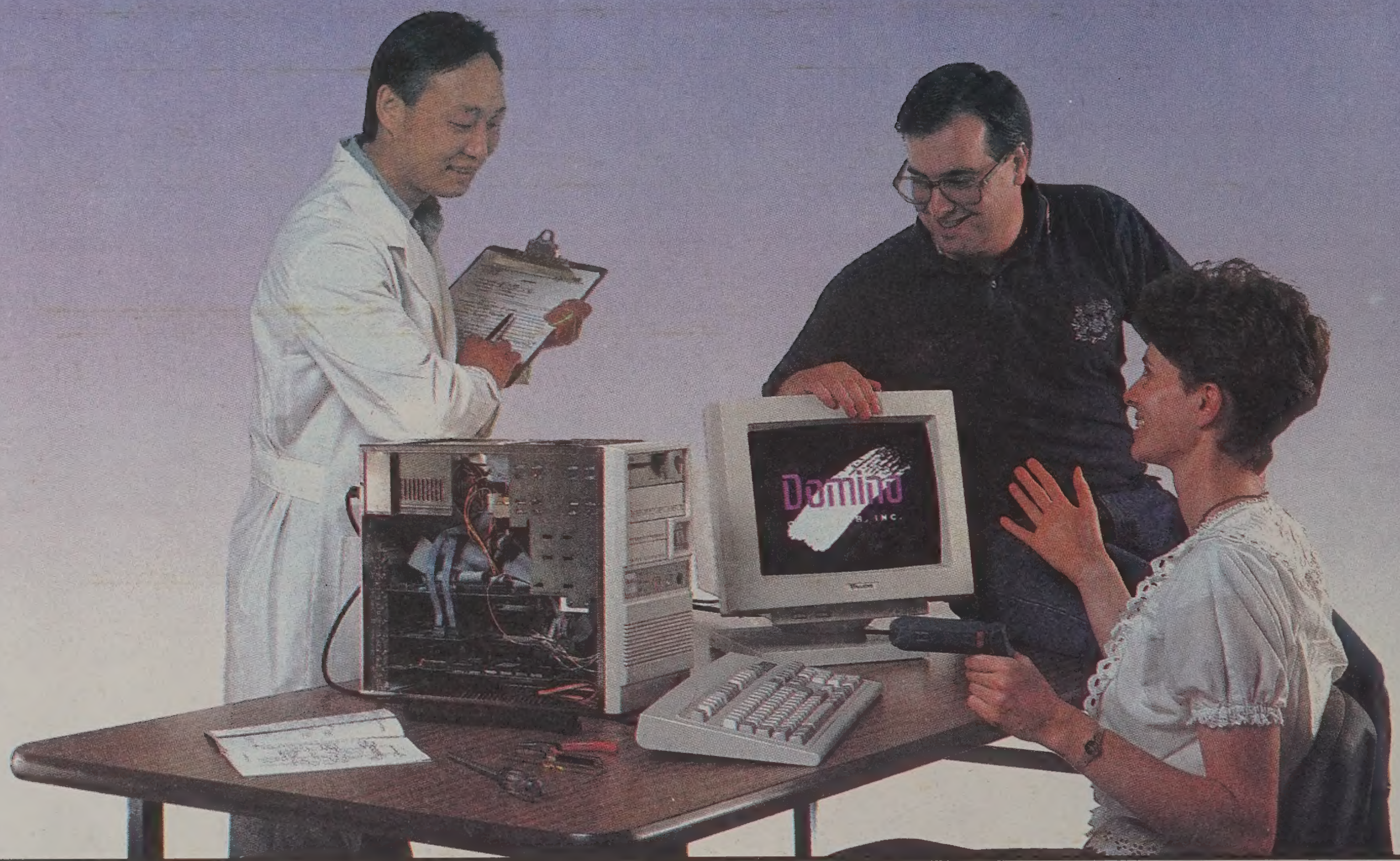

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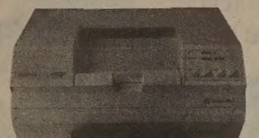

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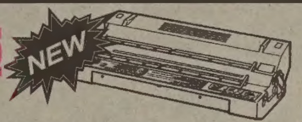

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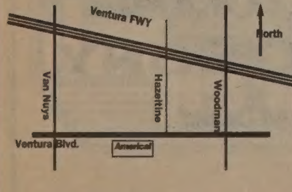

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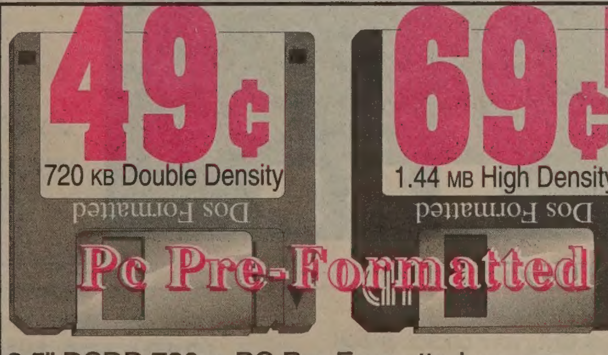

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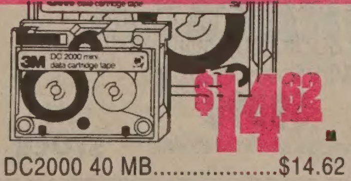
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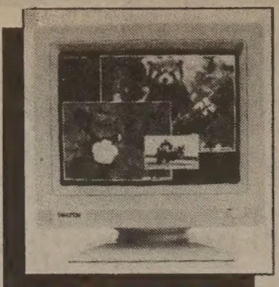

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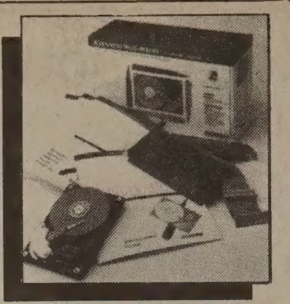

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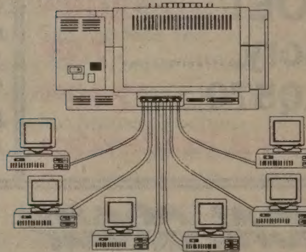

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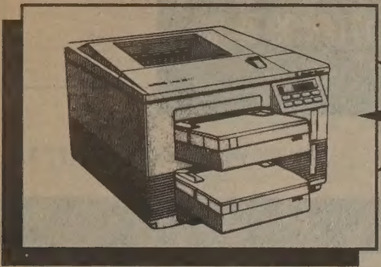

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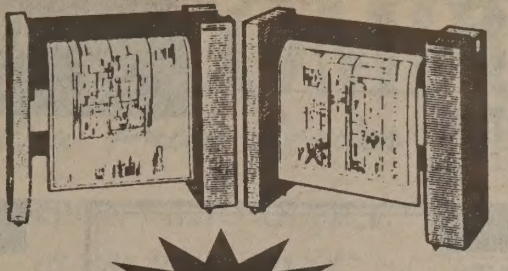

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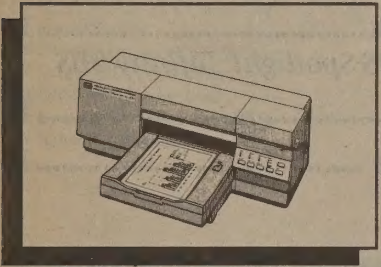

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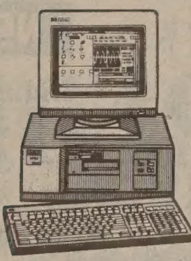

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A NOTE FROM THE EDITORS

We're pleased to bring you this month's cover story, an interview with author and interface expert Brenda Laurel, whose work has led her to some unusual conclusions about the way we're likely to be using computers in the future. We hope you'll find the article interesting and thought-provoking.

For the multimedia-minded, we're also happy to present Tony Reveaux's interview with 3DO's vice president of technology, with some new points of view on the direction of mixed-media presentations and content.

—ME

COVER STORY

Toward A New Human-Computer Relationship

An Interview With Brenda Laurel

By Michael Robin 48

Cover and contents photos: Paul Winternitz

There are those who think we're taking an unnecessarily limited view of the way people should use and relate to their computers. Author Brenda Laurel, now at Interval Research, is one of them. Assistant editor Michael Robin pays her a visit and gets some interesting perspectives.

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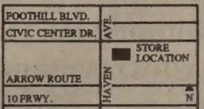

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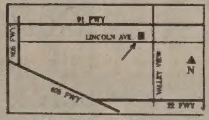

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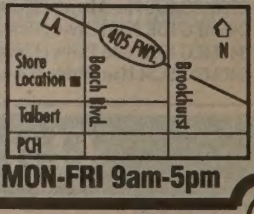

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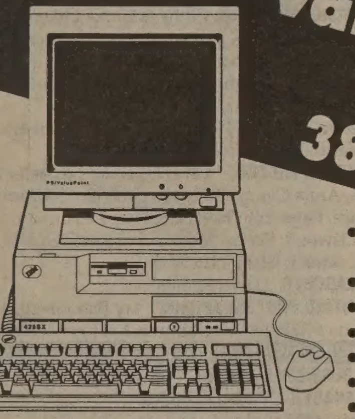

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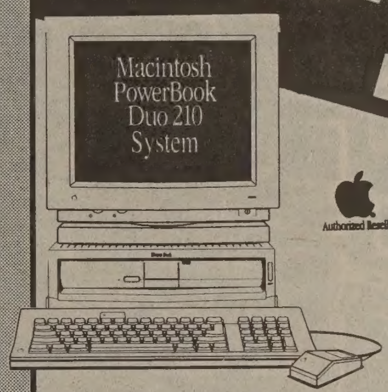

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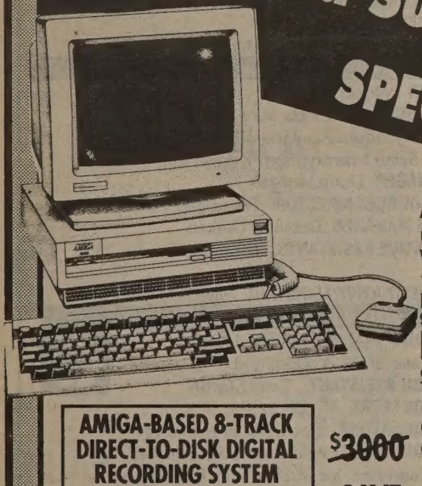

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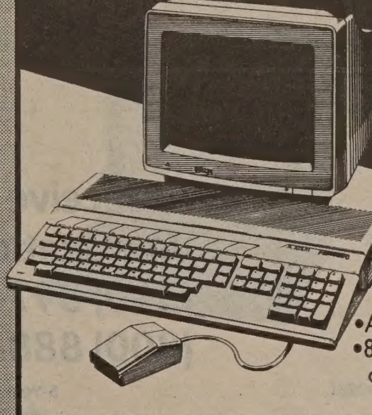

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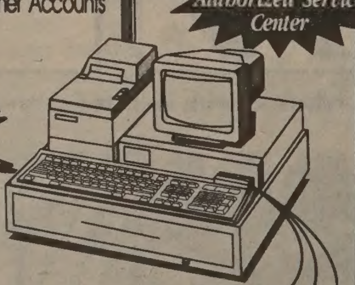

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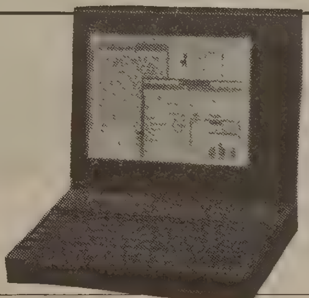

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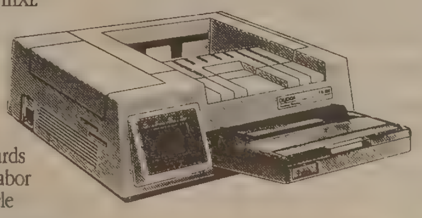

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NEWS & VIEWS

INDUSTRY INSIGHT

A Bad Month For Intel: AMD's 486, Low-Power R4000, Motorola's PowerPC

BY PAUL HOFFMAN

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Paul Hoffman is an industry analyst who has been covering microcomputer technology for ten years. He can be reached on Internet (phoffman @well) or CompuServe (71545,346). He also writes popular microcomputer books.

April was not a good month for Intel. The giant chip-maker saw many companies attacking it from all sides, and the stock market started to get the hint by dropping its stock by almost 20%. Although no one expects Intel to lose its position as the biggest supplier of CPUs, it will have to fight much harder for that title in the future.

In the middle of April, a judge overturned Intel's previous victory against AMD in a major case. Earlier, a jury had ruled against AMD in a case in which Intel had claimed that AMD's license did not allow them to copy Intel's chips. In that ruling, the jury decided that the original agreement between AMD and Intel allowed AMD to copy Intel's "microcode" for the 80287 chip, but not to distribute it. However, Intel (knowingly or unknowingly) withheld internal Intel documents from AMD's lawyers before the trial.

With an estimated 100,000 chips in stock, AMD can quickly help manufacturers who are very low on Intel's priority list to get new 486-based systems on the market.

Judge William Ingram of the US District Court ruled that those documents could have had a significant effect on the case. He said that the documents "would all have been admissible as party admissions and should have been produced before trial. The failure to produce them substantially interfered with AMD's discovery and trial presentation. Moreover, the non-production prevented AMD from fairly presenting its defense." The judge was clearly unimpressed with Intel's reasons for not giving the documents to AMD, and went on to say that "The trial value of the documents in question is obvious." He granted AMD's request for a new trial, which unfortunately may be years away.

AMD responded to the good news by beginning to ship its stock of cloned 486 CPUs to customers. The chips, called AM486, are exact copies of Intel's chips, with few additions made for advanced features. AMD had manufactured the chips earlier with the expectation of shipping them, but couldn't sell them after the earlier ruling. With an estimated 100,000 chips in stock, AMD can quickly help manufacturers who are very low on Intel's priority list to get new 486-based systems on the market.

AMD now is so sure that the new case will go against Intel that it is shipping the possibly-infringing chips immediately. After the earlier case, AMD had begun to create 486 clones that are probably more defensible in a future case because they are not based on Intel's microcode, but those chips won't be ready in quantity until late summer or early fall.

Unfortunately for consumers, AMD's prices are the same as Intel's, so the new chips won't lower the average cost of systems. The chips will be attractive to only a few manufacturers who already do not rely completely on Intel, and who have good relations with AMD for its 386 chips. AMD is taking advantage of the very high profit margin on the chips and the fact that, until the ruling, most companies expected to have to pay Intel's high price.

Intel followed AMD's announcement with its own, saying that it would deliver dozens of new 486 models this year. Although the huge number of different models should keep some manufacturers happy, it will hinder Intel in the consumer marketplace by giving the average user far too many choices among similar-sounding machines. Further, Intel's customer base is starting to revolt against Intel's allocation rules for the still-not-shipping Pentium and low-power 486 chips. Zenith, a major PC manufacturer who is particularly strong in the government market, has said publicly that they are looking at Intel's competitors for new CPUs. This is the first admission by a major manufacturer that Intel may not be the only name on CPUs in their systems.

While Intel may be flooding the market with different styles of 486s, other chip makers will be introducing non-Intel CPUs that will start to compete on the high end, where Intel makes much of its money. The market for the Pentium chip is about to become more crowded. MIPS announced that it will be much easier to build high-end notebooks using R4000 clones running Windows NT than it will be to build Pentium notebooks. Two manufacturers will sell chips (and MIPS will sell design kits) that use CPUs that draw only 2-3 watts of power. On the other hand, Pentium is expected to draw over five times as much, making it completely unusable in a notebook due to the much quicker battery drain. Both of the chips will allow NT users to buy systems that are as powerful as Pentium desktop computers, but are portable and cost about the same.

Motorola is not letting up on Intel, either. It recently announced its new PowerPC RISC chips at prices significantly below Pentium. Although there is, so far, no operating system for the PowerPC, it is widely expected that Microsoft will port Windows NT to it very soon and the PowerOpen UNIX operating system should be available next year. If Motorola can keep the prices for the chip low relative to Pentium, PowerPC systems could make the low-end RISC system market much harder for Intel to penetrate.

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The Santa Cruz Operation, one of the largest vendors of UNIX operating system software, settled the lawsuits against it for the actions of its founder and president, Larry Michels (MicroTimes #105). The amount and other

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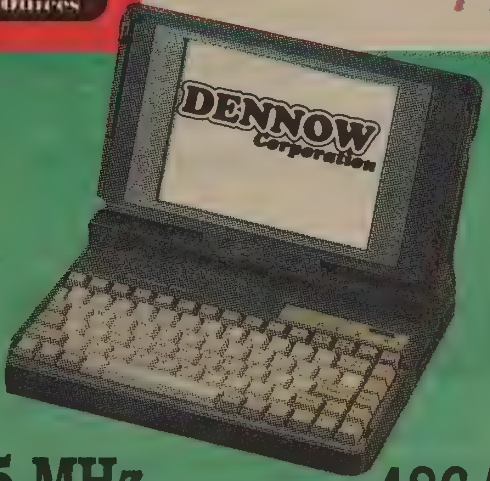

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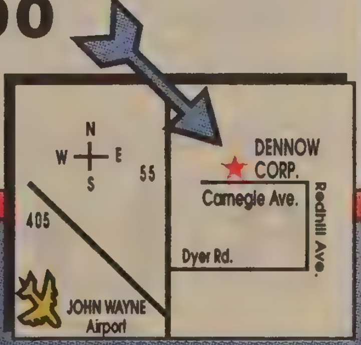

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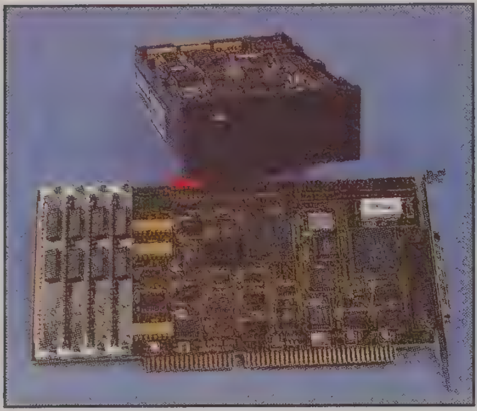

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TOTAL	$2300

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Continued from page 12

terms of the settlement is confidential, but it is expected that the four women who filed the lawsuit last December received a total of more that $1 million. SCO was motivated to settle the lawsuit so that it could proceed with its widely anticipated initial public offering (IPO), which would have been significantly hindered by the pending suit.

Soon after announcing the settlement, SCO filed with the US Security and Exchange Commission to be able to sell stock in the company. The initial filing, which is meant to reveal all facts that a potential purchaser of the stock would find relevant to the company, revealed some interesting information about SCO. These filings, called "10K forms", are often the public's first glimpse of the inner workings of a company, since most companies are very secretive with their financial information before going public. Among the facts presented in the document, dated April 2, 1992, are:

- SCO gets almost half of its revenue from international sales. The percentage has increased in the past few years.
- SCO was not consistently profitable until 1992, and there is no clear indication that it will continue to be profitable after the stock offering.
- SCO's license with Microsoft for UNIX and XENIX has many conditions that let Microsoft out of the contract and would force SCO to find an alternative vendor. Basically, if SCO is bought or merged with a company that is a competitor of Microsoft before 1996, Microsoft can terminate its license with SCO. This would effectively prohibit SCO from seeking a major partner without Microsoft's approval unless that partner was able to provide SCO with the same access to UNIX source code and other technology.
- Even more interesting, the same contract prevents Microsoft from buying more than 20% of SCO before 1996, unless both Larry and Doug Michels are no longer officers and they have sold most of their shares of the company. That provision makes it clear that, if both Michels leave SCO and sell their stock, Microsoft could take over SCO.

The 10K form provided even more interesting information about SCO's continuing relationship with Larry Michels after he resigned as president, CEO, and board member in the wake of the sexual harassment suit. Although he was only drawing an annual salary of $137,500 plus benefits before his resignation, he is now drawing over $236,000 on a paid leave of absence as long as he does not go to work for a competitor. Further, he may name his own successor to the board of directors (as long as that person is "reasonably acceptable" to the board), and that person will be on the slate of officers for the first board after the company goes public. To date, Michels has not chosen his replacement on the board. Although SCO is only required to pay Michels the $236,000 through the end of this year, they have the option of extending it for another three years.

The IPO also revealed that SCO leases a significant portion of its office space from a real estate partnership owned by Larry and Doug Michels. Further, it appears that SCO set aside about $1.5 million for lawyer and settlement fees when it was sued last December, although the actual figure is not stated in the 10K form. Due to SEC rules, SCO cannot discuss its financial dealings until after the offering is complete, which could be in as little as a month.

MICROSOFT AND INTEL COME TO CABLE TV

Not happy to trust the home market to multimedia, Microsoft and Intel have teamed up with General Instrument, the major manufacturer of the components in most cable TV converter boxes. The result will be an Intel 386-based cable unit, complete with a Windows-like operating system from Microsoft, that will allow you to communicate more easily with your cable company, and thus get many services that are unavailable today. With the new converters, probably available next year in some areas of California, your cable company will be able to offer more two-way services through the standard coax connection.

General Instrument will combine its own compression, on-screen graphics, and communication hardware with a specialized version of Intel's 386 CPU in a box about the same size as today's cable converters. By using the 386, General Instrument was able to get the specialized version of Windows easily ported to the new system. The trick will be to offer enough power in the box to entice cable operators to design or buy new services for their subscribers (such as interactive TV listings, quiz contest software, and so on) while still making the unit easy to use. The latter may turn out the be the most difficult task for the 90% of the country that does not use Windows or a Macintosh computer.

Given the low cost of mass-producing low-end 386 CPUs, the cost of the converter box may not be much more than today's boxes, depending on the hardware the viewer uses to control the converter. However, cable companies have come under intense pressure from subscribers and the FCC to lower prices, so forcing a higher-cost controller on customers seems unlikely in the current market. The box will, however, probably be popular in areas where the cable franchise is up for grabs or where costs are already high and the cable service wants to keep people happy. ■

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COMPUTER STOCKS TUMBLE WHILE DOW HITS NEW RECORD HIGH

While the dollar fell to a post-war low against the yen and the yield on 30-year bonds fell to a 16-year low, computer stocks retreated during the month of April.

When trading came to a halt, here is how our basket of stocks performed: the Microtimes Stock Index surrendered 122.26 points, or 2.91%, en route to a close of 4074.63. The Dow Jones Industrial Average, in comparison, hit a new record high at 3478.61 before profit-taking trimmed the indicator 14.32 points, or .42%, to its closing mark of 3425.12. The old high for the Dow Industrials was 3478.34 set on March 10 of this year.

Adobe topped the leaderboard last month as that stock soared 34.7%, or $14.75 a share, to a new 52-week high of $57.25. The company said customers reacted very positively to its new Acrobat line of imaging software. In addition, Merrill Lynch began its coverage of Adobe with an "above average" rating, citing the potential success of the company's Acrobat software.

In stark contrast, Intel crashed $15.75 a share and was the largest dollar-loser of the lot. The semiconductor maker's stock slumped amid concerns about increased competition from Motorola, which may prompt a price war. Intel concluded matters at $95.75.

Apple fell under the weight of sell orders last month, as it slipped $1.00 a share to $50.75. Analysts were divided last month as to the company's future earnings prospects. Furman Selz and Merrill Lynch turned negative on the stock last month while Salomon Brothers raised its rating on the stock to "buy" from "hold." Apple's second-quarter net income fell 18% to $111 million while sales rose 15% to $1.97 billion.

IBM toppled $3 to $48.88. Last month, the company reported a first-quarter loss of 50 cents a share, down from a profit of $1.12 a share at this time last year. The loss, however, was smaller than Wall Street had expected.

Sun Microsystems downticked 11.25% to $27.63 a share. The company disappointed investors last month when it reported lower-than-expected third-quarter earnings of $51 million vs. $61 million in the year-ago period. The stock subsequently was removed from Goldman Sachs' "recommended list."

EXCH	COMPANY	TICKER SYMBOL	CLOSING PRICE 04/01/93	CLOSING PRICE 04/29/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH	P/E RATIO	ANNUAL DIVIDEND RATE	ANNUAL DIVIDEND YIELD	ANNUAL HIGH	ANNUAL LOW
	SOFTWARE										
OTC	Adobe (H)	ADBE	42.50	57.25	14.75	34.71	29	0.40	0.70	57.25	25.25
OTC	Aldus	ALDC	18.75	15.00	–3.75	–20.00	–	0.00	0.00	22.25	10.25
OTC	Autodesk	ACAD	43.63	40.25	–3.38	–7.74	23	0.48	1.19	56.50	29.75
OTC	Borland	BORL	21.25	22.25	1.00	4.71	–	0.00	0.00	54.50	17.50
OTC	Informix	IFMX	33.50	37.50	4.00	11.94	22	0.00	0.00	42.00	12.13
OTC	Lotus	LOTS	25.63	25.50	–0.13	–0.49	15	0.00	0.00	33.25	14.75
OTC	Microsoft	MSFT	93.00	85.50	–7.50	–8.06	29	0.00	0.00	95.00	65.50
OTC	Novell	NOVL	32.00	29.25	–2.75	–8.59	33	0.00	0.00	35.25	22.50
OTC	Oracle	ORCL	36.88	34.88	–2.00	–5.42	50	0.00	0.00	37.50	14.00
OTC	Software Publishing	SPCO	13.75	7.88	–5.88	–42.73	–	0.00	0.00	19.50	6.75
OTC	Symantec	SYMC	13.38	12.75	–0.63	–4.67	–	0.00	0.00	44.25	5.88
	HARDWARE										
OTC	Apple	AAPL	51.75	50.75	–1.00	–1.93	12	0.48	0.95	65.25	41.50
OTC	AST Research	ASTA	13.75	13.75	0.00	0.00	8	0.00	0.00	24.25	11.25
NYS	Commodore (L)	CBU	5.00	4.38	–0.63	–12.50	–	0.00	0.00	12.88	4.25
NYS	Compaq	CPQ	50.00	47.38	–2.63	–5.25	14	0.00	0.00	58.50	23.13
NYS	Digital Equipment	DEC	43.75	43.38	–0.38	–0.86	–	0.00	0.00	49.25	30.38
OTC	Dell	DELL	35.00	28.63	–6.38	–18.21	11	0.00	0.00	49.88	15.00
NYS	Hewlett–Packard	HWP	75.63	73.75	–1.88	–2.48	22	0.80	1.08	82.88	50.25
NYS	IBM	IBM	51.88	48.88	–3.00	–5.78	–	2.16	4.42	100.38	45.88
NYS	Silicon Graphics	SGI	27.63	32.50	4.88	17.65	–	0.00	0.00	33.00	16.13
OTC	Sun Microsystems	SUNW	30.00	26.63	–3.38	–11.25	22	0.00	0.00	41.00	22.50
NYS	Xerox	XRX	83.13	75.38	–7.75	–9.32	–	3.00	3.98	88.88	66.75
NYS	Tandy	TAN	30.13	29.38	–0.75	–2.49	26	0.60	2.04	32.13	22.25
	CPU'S										
NYS	Advanced Micro Devices (H)	AMD	22.63	29.13	6.50	28.73	13	0.00	0.00	32.88	7.38
OTC	Intel	INTC	111.50	95.75	–15.75	–14.13	15	0.40	0.42	121.25	46.50
NYS	LSI Logic	LSI	12.25	10.63	–1.63	–13.27	–	0.00	0.00	14.13	4.88
NYS	Motorola (H)	MOT	65.13	72.25	7.13	10.94	29	0.44	0.61	74.88	37.13
	COMMUNICATIONS										
NYS	AT&T (H)	T	57.00	56.13	–0.88	–1.54	19	1.32	2.35	60.38	40.63
NYS	BellSouth Corp.	BLS	56.00	53.13	–2.88	–5.13	16	2.76	5.20	57.50	46.75
OTC	MCI (H)	MCIC	44.88	46.88	2.00	4.46	20	0.10	0.21	49.25	29.88
NYS	Northern Telecom	NT	36.75	36.25	–0.50	–1.36	17	0.36	0.99	46.00	30.50
NYS	Pacific Telesis	PAC	47.75	46.25	–1.50	–3.14	–	2.16	4.67	49.38	39.25

KEY: NYS = NEW YORK ASE = AMERICAN OTC = OVER THE COUNTER
(H) = NEW HIGH REACHED IN PERIOD (L) = NEW LOW REACHED IN PERIOD

MARKET DIARY:

ADVANCES	7
DECLINES	24
UNCHANGED	1
NEW HIGHS	5
NEW LOWS	1

MOST ACTIVE ISSUES:

LARGEST DOLLAR GAINER	Adobe	$ 14.75
LARGEST DOLLAR LOSER	Intel	$ –15.75
LARGEST PERCENTAGE GAINER	Adobe	34.71 %
LARGEST PERCENTAGE LOSER	Software Publishing	–42.73 %

	CLOSE 04/01/93	CLOSE 04/29/93	NET CHANGE IN MONTH	PERCENT CHANGE IN MONTH
MICROTIMES STOCK INDEX	4196.89	4074.63	–122.26	–2.91
DOW JONES INDUSTRIAL AVERAGE	3439.44	3425.12	–14 32	–0.42
STANDARD & POOR'S 500 STOCK INDE	450.30	438 89	–11.41	–2 53
N.Y.S.E. COMPOSITE	248 74	242.48	–6.26	–2.52
NASDAQ COMPOSITE	686.64	658.45	–28.19	–4 11

CLOSING QUOTES FOR GRAPH:

DATE	MICRO TIMES	DOW JONES
09/25/92	3313.28	3250.32
10/23/92	3536.03	3207.64
12/10/92	3825.83	3312.19
01/11/93	4020 09	3262.75
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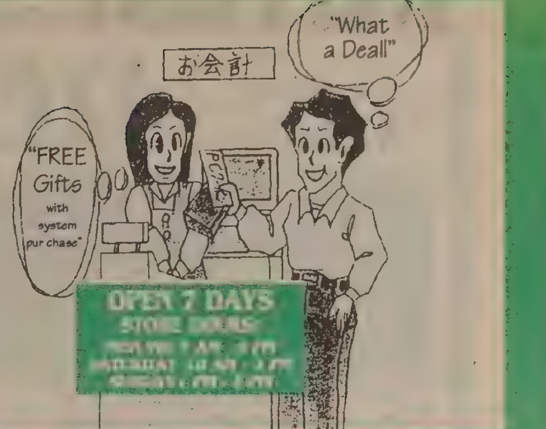

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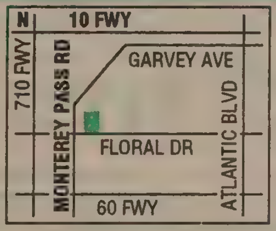

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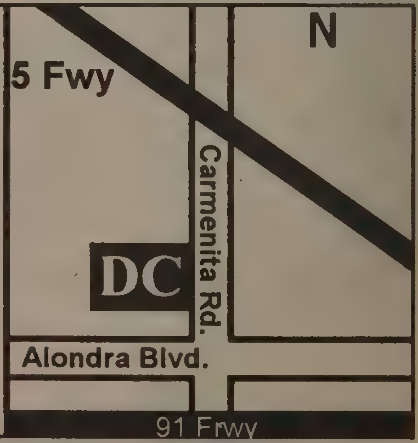

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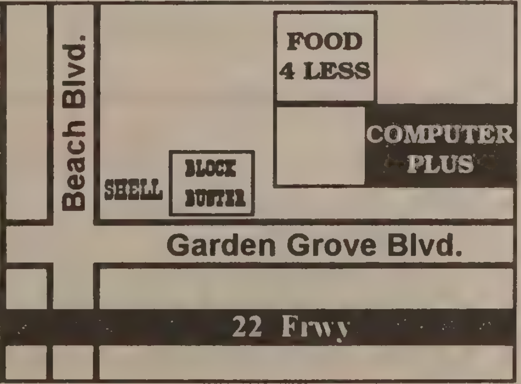

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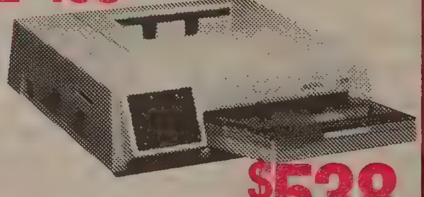

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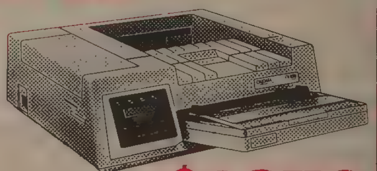

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Dial-Up Access to Legislation: An Update

Or, My Trip To Sacramento

BY JIM WARREN

These columns concern what ain't, but could be—as soon as we do it.

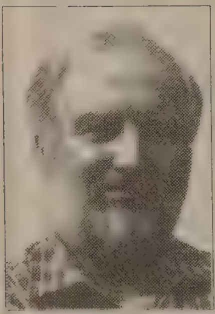
This one concerns dial-up, computer-based access to legislation in process, government codes, and a state constitution from home, school, office—or even from a courtroom via cellular modems or digital-radio connections.

[Query: Recent columns on access to computerized public records generated more snailmail and email than any other issue in the half-decade this column's been running. However, one e-message lamented the lack of proposals for gadgets-to-be, the former fun focus of this column. I'd love to babble about techno-toys, but computer-related government policies—in-process and public access to that process seem too important to disregard.

Encourage other trade and lay publications to give it regular, in-depth coverage. Then I'd contentedly talk technical again. What do you think? My address is in the sidebar. -jim]

REALIZABLE FANTASIES

California Assembly Bill 1624 (Bowen) would mandate that already-computerized public legislative data be publicly accessible by modem. By the time this appears, it may have died in a committee, or be moving forward due to public support—which has kept it alive, so far. This column illustrates what's involved in any effort to obtain online access to computerized public records.



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CITIZEN ACCESS: A TRUE STORY

Each bill is heard by several committees. If an Assembly committee votes against it, then the proposal cannot again be reintroduced in the Assembly until 1995, the next two-year session.

The first hearing was by the Assembly Rules Committee, John Burton, Chair (D-San Francisco). Four people came forward to speak: The bill's sponsor; Ted Laliotis, a Los Altos City Council member and former Mayor (and also Director of Emerging Technologies for Hewlett-Packard, but not representing HP); Ruth Holton from Common Cause; and me.

But only Bowen and I were permitted to speak. As soon as Ms. Bowen began explaining her bill—and almost every time she spoke thereafter—a man sitting near Chairman Burton immediately began talking to him in much more than a whisper. I found later that he was the Assembly's Chief Administrative Officer, Bob Connelly—an Assembly staff member, not an elected official.

At one point, Bowen displayed a file-folder of support letters and faxes about an inch thick. No one seemed to notice or care.

I had the impression that Bowen was not finished, but the Chair asked, "How's this going to be done?" (The bill had no implementation details.) Although at least Laliotis and I had prepared some brief comments, the question ended planned presentations and the hearing became a random discussion. Laliotis had planned to mention some Silicon Valley civic-networking plans, and outline local governments' need for this online access, currently unavailable without great expense.

A technical question came up, and I used the opportunity to propose that public access could be implemented by making legislative data available via the Internet, costing the state no more than a daily phone call. I outlined its cooperative character, free exchange of information, and the fact that many other major public and proprietary networks are connected to the Internet and could pass the files along—to FidoNet, BITNET, GEnie, AOL, Compu$erve, etc.

In particular, the Legislative Data Center (LDC) could transmit files nightly to one or several cooperating Internet host-computers that would agree to receive the files, store them securely, and allow other hosts to copy them, all without charging the state or the other hosts.

Costs: The LDC Director agreed in early April that a server-class computer could do this, e.g., an about-$1,700, 486-based machine could handle a dozen simultaneous ftp transfers over a 56Kb link. They might also need a router (about $1,700) and a DSU/CSU (about $600). I said I'd find a donor machine if necessary. The regional hub for the high-speed national network-backbone is in downtown Sacramento, so a 56Kb line would cost $0-$120/month—the only cost to the state, assuming donated gear.

Data volume: The last two-year legislative session generated 676,513,792 bytes of data, approximately. The twenty-nine state codes and the constitution—which Bowen requested be amended into the bill—currently take another 124,097,288. Thus, a $1,500 gigabyte disk could store two years of legislative data, the codes and constitution—and have 500MB to spare.

Several committee members showed clear doubts—perhaps disbelief—that people (a) would accept and store files without charging the state, and (b) would actually share them with others without charge. They questioned those ideas at length.

PROGRAMMING NEEDED; FREEWARE CONCEPT QUESTIONED

Strike-thru, underscore and italicized text has semantic meaning in the legislative process. Furthermore, amendments are specified in terms of isolated text-changes to numbered lines—and the LDC doesn't provide the numbers; the Office of State Printing's typesetting program adds them.

The legislative data-files contain text plus markup codes that indicate fonts and formatting. The markup is in CGML—California Generalized Markup Language, not the industry's SGML (the Standard

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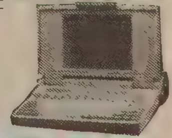

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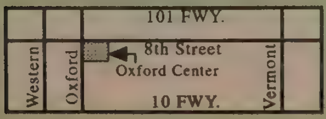

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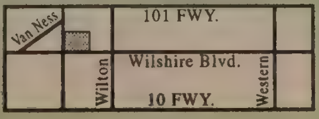

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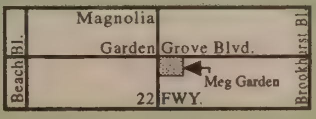

Generalized Markup Language). Programming must be done to make this data useful.

I said that—if they would simply make the data available across the net, for free—numerous programmers would develop various software to access, display, search, extract, index, cross-reference and otherwise make the data useful, and would often share them freely.

That was an even more alien than free storage and file-sharing. There were queries of "Why would they do that?" and, "What's in it for them?" I mentioned civic responsibility, public access to the public's legislative process and just "Because it's there," but some were obviously unconvinced.

They expressed concerns about files being modified. The only explicit example was that legislators' votes might be modified, misrepresenting their positions. I said there were numerous established solutions to this, mentioning that the US Supreme Court is issuing its decisions online, and the White House is distributing volumes of position statements, directives and even the proposed budget—all of as "unprotected text." No one mentioned that anyone can use a paper copy of a bill or vote-count to make false copies on a home copier in a few minutes.

LDC could calculate a large checksum or hash-code of each file before transmitting it, and send them and their algorithms directly to file recipients wanting to verify that the data was unmodified. Or, the most robust solution would be to use public-key digital signatures. The LDC could encrypt the data with their private key; the receiving hosts could decrypt with the matching, published key.

MONEY, MONEY, MONEY

There was also serious discussion of whether they could make money from this—especially from recipient hosts that charge users for access. This prompted a side-discussion about giving away copies of bills versus selling them in their "bill room."

I urged that host operators not charging extra to use this public data not have to pay for it. Without thinking it through, I expressed less concern if the Legislature collected royalties from operators that charged specifically for using legislative data. I gave the example of Compu$erve's extra charges for using the OAG (Official Airline Guide), without remembering that it was privately-authored data, whereas this is the public's information.

They asked how they could protect "their" data; I [stupidly] suggested copyrighting, but grant free use for those who don't charge extra for using it. Dumb idea!—but they were clearly concerned that someone might make money off of their data without them sharing it.

A STATE-RUN PUBLIC FACILITY?

Someone mentioned the possibility of their running their own public-access system. This was not extensively discussed, but it remains an alternative that will be addressed. And a week after the meeting, several vendors said that LDC staff had just requested bids for providing Internet connections. I had the impression that legislator's interest was in possible profits, but it could easily be concern for integrity of data or for control. I doubt that they have realized that a state-run operation could easily monitor who's accessing what—although voter-registration is available to all staff at a keystroke.

Several committee members showed clear doubts—perhaps disbelief—that people (a) would accept and store files without charging the state, and (b) would actually share them with others without charge.

CREDIT WHERE CREDIT'S DUE

Near the end of the hearing, one committee member spoke up strongly in favor of the proposal. He said it was the way of the future and the legislature should be part of it. I later found that he was Ross Johnson (R-Fullerton). Chairman Burton then looked at me, said, "Get me a memo on this," and declared they'd delay action on it. There was no vote.

SOME ISSUES TO BE RESOLVED

1. Can they make money selling the public's legislative data?
2. Should they set up their own public-access system?
3. Can they collect money from those who charge for using this data? How? They seemed to clearly dislike any recipients profiting from distributing it—electronically—unless they get a share; regardless of whether many others make it freely available.
4. Can they legally protect it—the copyright issue?
5. Can the integrity of the data be assured if copies circulate beyond their control? Copies already do circulate beyond their control, to customers of current high-fee private distributors.
6. Would people really receive, store and share the data, and develop and share processing programs, for FREE!?
7. They still need better understanding of the Internet—structurally, operationally and culturally.
8. If they transmit to Internet hosts, which ones? Public-sector hosts? Others?
9. Should this be studied, reviewed, considered, analyzed and picked apart? That's the standard mechanism for delaying or killing a proposal that has public support.
10. Minor red herrings: There are only a few [million] "elite" computer users in California who could use this. There's also lobbying for some monumentally-expensive public-access alternatives—IBM kiosks in malls, 800-number phones with information clerks standing by, etc. But, (1) this proposal does not preclude the more grandiose schemes and (2) this could be implemented in weeks!

It helps to write, fax and talk to your Assembly and Senate representatives.

SPEAKING OF COMPUTERS

I often speak on technology, government, freedom and privacy, and also about personal computing's history and futures. On May 27th, I will join Terry Winograd and Denny Brown in discussing "The Future of Computing and Its Impacts on Society" before Silicon Valley's Churchill Club. June 18th, I will be the banquet speaker for the Ohio Libertarian State Convention. ■

Warren founded InfoWorld, *Wireless Digital, Initiative, Inc. and one of the nation's largest public microcomputer conventions. He was founding host of PBS's* Computer Chronicles, *founding editor of* Dr. Dobb's Journal, *and has chaired various trade and professionals' organizations. He holds graduate degrees in computing (Stanford), medical information science (UC Medical Center) and mathematics & statistics. He has been a computer professional since 1968, and was a mathematics teacher and professor for ten years before that.*

He organized and chaired the landmark First Conference on Computers, Freedom & Privacy (1991) sponsored by a dozen nonprofit civic, professional and industry organizations and received one of the first Electronic Frontier Foundation Pioneer Awards (1992). He is a member of the board of directors of Autodesk, Inc., and also chairs the Communications Committee of the California Public Records Act Reform Coalition.

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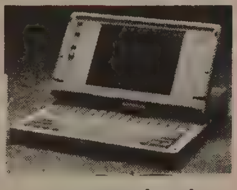

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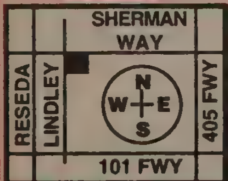

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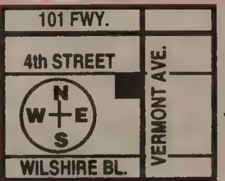

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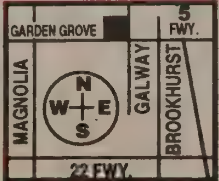

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Letters

DEA SETS THE RECORD STRAIGHT

In last month's issue, discussing the outcome of the Steve Jackson Games case, news editor Paul Hoffman wrote: "The concept that the government could take all the assets of a bulletin board system, put it out of business, and never file charges is indeed scary for computer users. One only needs to look at the zeal of the US Drug Enforcement Agency when it gets warrants to see how frightening the prospects could get for computer users. The DEA can seize property and sell it to fund their activities, without even bringing a single charge against the owner. Recently, a Ventura County district attorney said that the DEA was so interested in getting a $5 million ranch that was supposedly used to grow marijuana that they put together a trumped-up warrant and tried to seize the ranch, killing the owner during the raid; no marijuana was found and no charges have been brought. If the Secret Service gets such powers in its raids on supposed computer criminals, all the time claiming to not know the laws, the situation could be just as dire."

We subsequently received the following communication from Ralph B. Lochridge of the Los Angeles Division of the DEA. While we continue to believe that such egregious incidents as the lethal raid in question and the Steve Jackson Games episode deserve public scrutiny and accountability, whatever agency is responsible, we are happy to set the record straight regarding the nature of the DEA's involvement in the Southern California case.

—Eds.

This letter is regarding *MicroTimes* issue #108, in which you published an article by Paul Hoffman that dealt with the DEA.

First, Mr. Hoffman refers to DEA as the Drug Enforcement Agency—the correct name is the Drug Enforcement Administration. Secondly, the statement that he in part attributes to the Ventura County district attorney is false. Mr. Hoffman should check his facts.

The search warrant, the affidavit supporting the search warrant, the execution of the search warrant, the entry onto the premises, and the death of Don Scott were done solely by Deputy Sheriff Gary R. Spencer and other members of the Los Angeles County Sheriff's Department.

The role of the DEA was in providing observations that were written into the warrant by the Sheriff's office, and at the request of the LASD two DEA agents were on the ranch at the time the warrant was executed by the Sheriff's Department. At no time did those agents enter the residence; only the Sheriff's Department made entry into the Scott house.

This was a Los Angeles Sheriff's Department-led investigation and raid.

According to the report on the death of Donald Scott by District Attorney Michael D. Bradbury, he states, "Because it cannot be proven that Spencer knowingly lied in the affidavit, there is an insufficient basis for a perjury prosecution."

Ralph B. Lochridge
Director of Public Information
DEA, Los Angeles Division

DISABLED READER SEEKS DONATED COMPUTER

I am sending you this fax in hopes that you can help me out of a mess that I find myself in at this time. I have a 286 AT clone that I bought new back in 1987 with two 40-meg hard drives and both floppies (high density). As of about two months ago the hard drives have been going out and I have had to reformat them four times, and lost all programs each time.

I am HIV positive and have severe ARC disabilities, and do not have the strength to do all this in writing, so I depend on the computer to do all my letters and correspondence with. I also do bookkeeping to earn some extra cash since I am on a low income, $600 a month, that does not allow for any extra money for repairs of the system that I now have. I am looking for a kind person who would be willing to help in my time of need. I have most of the software and one of the companies is sending me (free) their latest release (Peachtree), but without a sound machine to run them on, what is the sense of loading it again and again?

I am including my phone number and can be reached most days since I am almost homebound these days. I really hope that someone comes forward with a kind heart and is willing to help (I pray every night for this) and I hear something good back from this.

Cliff Wilson
Hayward

If you can help Mr. Wilson with his equipment problems, please call him at (510)887-1464.

—Eds.

COMPUTERS FOR INDIAN SCHOOLS

Thank you so much for running our request for donations of computers, software, and components. We have gotten more response from your magazine than from any other source.

Because of your generosity we are able to send computers to schools on the reservations. Now these children will get an opportunity to learn skills that will prepare them for the real world. They will be able to compete with other children.

Thank you, thank you, thank you!

Victoria Leslie
Red Cloud American Indian Society
Irvine

(We received this letter after Red Cloud requested a free classified ad in our Southern California edition. We thought their work was sufficiently important to bring it to the attention of a larger audience. If you can help with donated equipment or in some other way, contact Red Cloud at 714/833-3865.

—Eds.)

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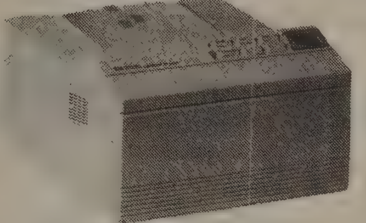

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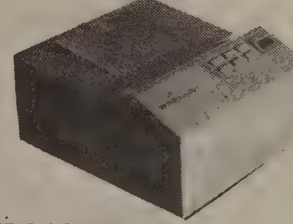

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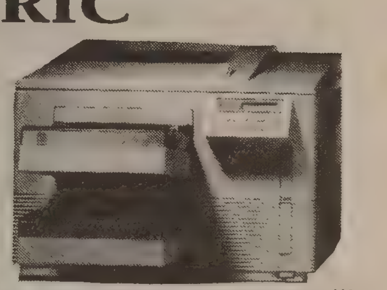

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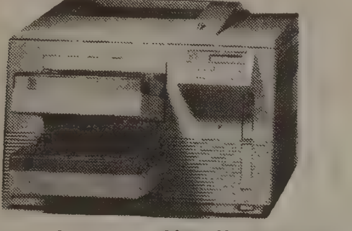

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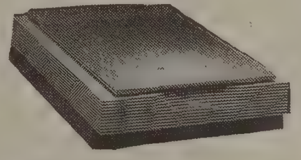

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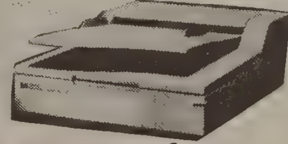

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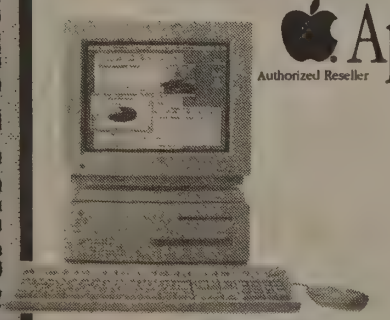

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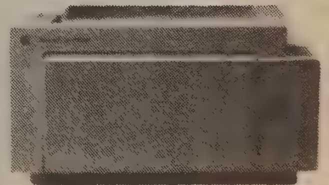

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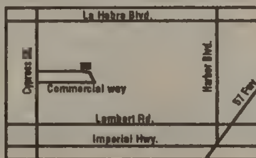

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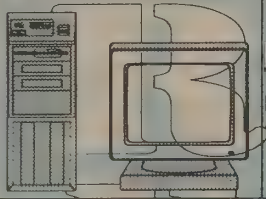

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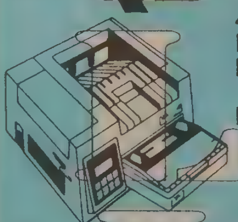

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I discussed the SF-R20 last month, but it's so affordable and useful that I decided it was worth writing another column on it. (In fact, I liked the unit so much that I purchased one.) This column features more detail about the unit—its problems, virtues, and features, as well as advice about how to use it to its fullest capability. I'll probably continue to talk about various tips and tricks regarding this palmtop and others in future columns. I encourage readers to send in their favorite tips and tricks as well

As I noted last month, the Casio B.O.S.S. series has traditionally been a poor second in quality and usability to the Sharp Wizard series, which has had most of the market share up until now. However, the SF-R20 is a new entry by Casio, and occupies a price/performance niche which isn't really served by the Sharp Wizard series yet. The SF-R20 costs about the same as the Sharp OZ-8200, but comes with twice the memory (256K instead of 128K) and a built-in spreadsheet as well. Its capabilities actually approach those of the Hewlett-Packard 95LX, which is in fact a palmtop computer, not just an organizer. The spreadsheet in the SF-R20 is the key element that sets the SF-R20 apart from other organizers.

SF-R20 and the HP 95LX

While the two machines are really in different categories, their capabilities approach each other, and some people may be looking at both machines to decide which one best suits their needs. The SF-R20 is an electronic organizer with a spreadsheet added in; the 95LX is really a full-blown DOS-compatible palmtop with Lotus 1-2-3 built in. In terms of price, the 512K 95LX sells for about $100 more than the SF-R20, however, to really make use of the SF-R20 you need to buy the serial interface cable and transfer software, which puts the machine in a similar price range as the 95LX with its much cheaper serial cable.

At first glance, one might think the 512K HP 95LX is the more capable machine. There's no question that the 95LX is more powerful in some respects: it carries with it a full-blown version of Lotus 1-2-3, it can run DOS applications, and so forth. However, DOS is not the ideal operating system for a palmtop organizer. Not only is it wasteful of precious RAM, but a 30K spreadsheet stored on the RAM disk actually uses at least 60K of RAM while being edited, due to duplication of RAM use—30K on the RAM disk itself, and at least an additional 30K while loaded into working memory. In addition, Lotus 1-2-3 is not as frugal with RAM as the Lucid spreadsheet in the SF-R20.

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SF-R20 B.O.S.S

The organizer applications in the 95LX do not take advantage of the graphical capabilities of the display, and in general are less friendly in appearance and use than those on the SF-R20.

The Lucid spreadsheet in the Casio SF-R20 is very conservative in its use of memory. Worksheets are operated on "in place"; there is no separate "file" into which they are saved, thereby avoiding duplication of RAM use. In addition, the Lucid spreadsheet is written to be extremely stingy with RAM; a typical spreadsheet file in 1-2-3 format often shrinks considerably when converted and uploaded to the SF-R20. For example, a checkbook spreadsheet I was using on my PC went from 60K when saved in Microsoft Excel format to 40K in Lotus 1-2-3 format to only 20K when loaded into the SF-R20. The total memory capacity of the SF-R20 is much larger than it at first appears; due to this frugality with RAM, one may even be able to store and work on more data on the SF-R20 than on a 512K 95LX, because the 95LX can consume more than twice as much memory as the SF-R20 for the same data.

The SF-R20 also comes with context-sensitive help and a friendly appearance to its various functions. The World Time function even highlights the various time zones in the world one at a time; if you're traveling, you might be able to actually pinpoint which time zone you happen to be in by using the world map, as well as setting by the city you're currently in. The 95LX, by comparison, has no graphical map associated with its World Time function. This is, of course, just a nicety, but it does detract from the overall sense of design of the 95LX.

Overall, of course, which unit is right for you depends on intended use, as always. For those people who primarily want a personal information manager with the added capability of a spreadsheet, the SF-R20 could well be the better choice. Those who need full Lotus 1-2-3 power or DOS compatibility would go with the 95LX.

For The Sharp User

Many people already have a Sharp Wizard and may be considering upgrading to the Casio SF-R20. There are a few things you should know about when thinking about this kind of upgrade.

> *There's no question that the 95LX is more powerful in some respects: it carries with it a full-blown version of Lotus 1-2-3, it can run DOS applications, and so forth. However, DOS is not the ideal operating system for a palmtop organizer.*

First, converting your data from the Sharp Wizard to the Casio format, will require the use of an intermediate format for converting your data. There is a standard format called the "SDF" format, which I believe stands for "standard delimited format"—basically a text file in a special format, just a list of text fields surrounded by double quotes and delimited, usually, by commas. You can even edit these SDF files in a text editor on your PC if you like. I found it fairly straightforward to convert my telephone and memo files from the Wizard to the Casio, since both read and write SDF files in the same order. One difference is that the Casio is limited to 384 characters per entry, much less than the OZ-8000 series, so some memo entries or telephone entries have to be split up before you can convert them. This isn't so bad, since the phone book supports "free fields" into which you can add additional comments or information that didn't fit in the address field.

Converting Schedule information is a bit more difficult. The SDF formats are completely different, and a couple attempts at using Sidekick format as an intermediate conversion format did not work for me, either. I ended up just reentering my Schedule entries by hand, working from a text file of the SDF output from the Wizard link program.

There are third-party programs, such as IntelliLink for Windows (mentioned in a previous column), which allow you to transfer data between a number of different organizers and the PC, including the Casio B.O.S.S. series and the Wizard series; I understand a version exists which supports the SF-R20. Though this product may make conversion much easier, it also costs $99.95 retail, so you might want to try converting using the SDF or Sidekick formats instead of spending the additional money for a third-party link program.

Some other differences: There is only one telephone book. Searches over telephone data are done in a case-sensitive manner only (unfortunately), so if you have keywords you're using, you ought to make sure they're all the same case (I adopted the convention that all keywords will be lower case except for proper nouns). As mentioned above, text entries are limited to 384 characters per entry. Otherwise, the two units are remarkably similar in use and user interface; the Casio has a slightly more complicated user interface, but the online help is much better. The Scheduler and World Time functions on the Casio are a lot more useful and flexible, in my opinion, than the similar functions on the Wizard.

Tricks And Tips

If you like to use the SF-R20 as a note-taking device, there are three different modes which I find useful.

The first is the Memo mode. Its advantage is that you can search over the text of all memos to quickly find a particular entry. It's quick and easy to store a new memo: just hit the Memo key, start typing, then hit "Set" when you're done. The problem with this mode is that if you're taking notes and do not hit the Set key, you lose your data if you wait too long and the power goes off automatically. (This is a problem with the Sharp Wizard as well.) In addition, the 384-character limit can be annoying.

The Free File mode doesn't have these limitations. As you type, the file is modified instantly. The disadvantage of this is that you cannot back out changes by hitting ESC or Clear—anything you type instantly modifies the file. The worst problem is that there is no way to search the Free Files for text. Also, the text editor is not very good: If you need to insert text in the middle of a file, it can be very slow. There is no way to page up and page down in a free file; you can only go to the top or bottom of a file, or move line-by-line in the file. So, overall, the Free File mode is good for taking down notes, but not very good for editing or inserting new information. In addition, it's terrible as a database, since you cannot easily search over the data.

I actually use the Spreadsheet mode for some note-taking at times. Though it is not very well suited to be a text editor, it has a number of advantages. You can page up and down in the files, you can do search and replace, and you can even insert spreadsheet calculations into your notes. In addition, copying and pasting between different files is rather easy. The Spreadsheet mode has some disadvantages, however. There is no way to cut and paste from the spreadsheet into the other modes, such as Memo or Free File. The Spreadsheet lives alone in its own world—it's like having two separate machines in one: an organizer, and a spreadsheet machine. To move data

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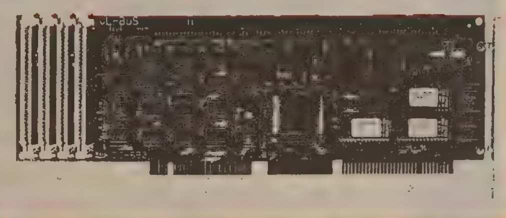

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to and from the Spreadsheet mode to other modes, you need to use the PC Link software. With this software you can convert to and from text files and other spreadsheet files and do whatever other manipulations you need.

Important notes regarding the PC Link software: When purchasing the PC Link for the Casio B.O.S.S. series, make sure it is v3.5 or later. Earlier versions do not fully support the SF-R20. The SF-R20 also comes with some mysterious software (SFD.EXE) which is apparently designed only for the Japanese version of the SF-R20, in addition to the "Lucid Link" software intended for use in transferring data to and from the Lucid spreadsheet. A call to Casio technical support about this mysterious SFD.EXE resulted in the answer: "Ignore it." There is no explanation of this in the Casio documentation. In addition, when using Lucid Link, you have to set the RTS polarity to OFF or it will not work. This is also not documented.

More PCMCIA News

Proxim, Inc., has begun shipping a wireless LAN adapter called the RangeLAN/PCMCIA. The adapter uses a PCMCIA Type II slot, and supports Novell NetWare 3.x, NetWare Lite, and Microsoft Windows for Workgroups, among others. The suggested retail price is $595. The server/desktop ISA PC adapter costs $495, and a version intended to plug into a PC via the parallel port is $595.

SMART Modular Technologies has produced a series of battery-backed "pseudo-static" RAM devices, intended to replace costly static RAM PCMCIA cards for applications requiring non-volatility over periods of ten days or less. The SM9PSDXMP3 uses a rechargeable battery which can provide up to 6MB of RAM; 50% more capacity than is available on static RAM cards. In quantities of 1000 or more, the 2MB PSRAM card will be priced at $90 each.

Cellular Packet Data Standard

A group of cellular carriers which is supporting the cellular digital packet data project has released its v0.8 of the open specification for transmission of digital data packets over cellular networks. This final specification is intended for publication in July. A field test demonstrated the ability to successfully "channel hop" (changing cellular channels without losing the data stream), and also the ability of voice and data to coexist on the cellular network, using unused voice channels for data as needed. The specification is available for $100. Carriers involved in this project include PacTel Cellular, GTE Mobilnet, and Ameritech Mobile Communications, Inc., among others. ■

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Memory Cards, File Transfers & Some Guesses

BY ED KAHN

RESOURCES:

FileRunner, $99.95
MBS Technologies, Inc.
34 W. Sycamore
Arcadia, CA 91006
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Hewlett-Packard 95LX, $550
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LapLink V, $169.95
Traveling Software Corp.
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SDP Storage Card, $599
Sundisk Corp.
3230 Jay St.
Santa Clara, CA 95054
1-800-688-7177

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Over the last few months, I have been raving about the possibilities and realities of PCMCIA, the standard that now makes it possible for vendors across company lines to make cards that will work with any computer that is equipped with a PCMCIA slot. As time moves on, it is becoming increasingly clear that more and more computers—especially the portables—will have these slots.

We are now beginning to see the fruits of these raves. Sundisk has just released the SDP Storage Card, a memory card that fits into the PCMCIA slot of a Hewlett-Packard 95LX palmtop computer. I have long praised the 95LX as the best of its class. It comes with lots of memory—up to 1024K—and includes many sophisticated applications such as Lotus 1-2-3. But still, despite all that the 95LX does, it is limited by the lack of a hard disk. Sundisk's card, coming in either 5MB or 10MB, offers a practical solution.

The 5MB card costs $599, which is not cheap, but it lets you store a huge amount of data files. In fact, you can store applications or anything else you want, but data files are the real advantage of a memory card like this. The usefulness of this handheld computer is greatly extended.

Just as important as the general usefulness of SDP Storage Card, are the implications for memory devices of the future. Traditional hard disks are thought by many to be an inferior technology. They are fragile, breakable, and slow compared to active memory. Although tremendous advances have been made on these devices, they still seem like the weakest link in the computer chain.

Memory has always been too expensive to use as a mass storage device, but that may all be changing. Over time, memory has come down in price dramatically. It may just be that cards like this Sundisk product point the way to the future. These cards offer advantages over competing storage devices. They are completely transportable between machines. (You can take this storage device with you anywhere, it fits comfortably in your shirt pocket.) Access is fast as the data does not have to be mechanically transferred.

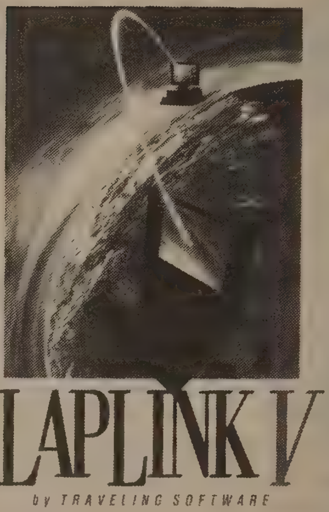
While PCMCIA cards are proving themselves to be particularly well suited to portable machines, desktop machines are beginning to appear with the slots; add-on devices that fit into desktop machines and allow you to use PCMCIA cards are coming to market. With PCMCIA capability on a desktop machine, there is no longer a reason to connect small machines with larger ones for the transfer of files. Simply swap the memory card out of the portable unit into the larger machine and copy files from one drive to another.

Let your imagination go and you can easily come up with many other advantages to this kind of universal memory device. It looks like this is just the beginning of a trend that may well change the way we manage the storage and transfer of files between computers of all sizes. For me, the goal is to be able to easily connect different computer systems so files can move from machine to machine as we use the right computer for the job.

FILE TRANSFER CHOICES

While this may be the wave of the future, there is still a need to physically connect machines together to transfer files back and forth. The leader in this field has long been Traveling Software with their LapLink software. They have just released the newest version of their landmark product, LapLink V. While the product builds on the foundation laid in earlier versions, there are additions that make this new release worth considering if you routinely are engaged in transferring files between computers.

On the surface, the most significant change is that you can install the software to run in the background under Windows 3.1. In fact, the interface is identical for both the DOS and Windows adaptations. As you install the software, it asks if you want to install it to run under Windows. If you answer yes, an icon is placed in the Windows program manager. You can, however, run the program in either a DOS or Windows environment.



LAP LINK V

There are a number of enhancements to this newest version of LapLink. Refresh Directory is just what many of us have been asking for. It lets you copy newer versions of only those files that already exist on the target computer. No other files will be copied with this command.

Clone Directory lets you make an exact copy of a selected source directory on the target computer. This is useful after you have cleaned up your files on one computer and want to duplicate the files on a second machine. Another twist on these ideas is the Synchronize command which makes two directories identical by taking the latest versions from each directory and transferring them to the other machine.

If you have tasks that are frequently repeated, you can create macros that do the tasks and then schedule these procedures to be done automatically on a daily, weekly or other repeating schedule.

Traveling Software has also added to the modem capabilities of the software. In previous versions, you could connect to another computer through a modem, but the remote capabilities now include a telephone directory so you can store frequently called numbers for ease of use. High-speed modems are also accommodated.

And finally, the newest version of LapLink will also work to transfer files on a peer-to-peer basis on a network. A network version is also available that is stripped down to meet

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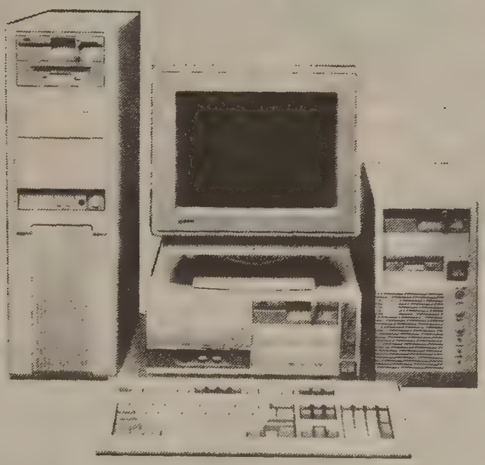

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the needs of network-only applications ($99.95/workstation).

If you have need to copy files and directories between computers on a regular basis, you need LapLink V. If, however, you only need to carry data from a few directories back and forth between your computers, I recommend FileRunner. This is the simplest file transfer utility available and works flawlessly. When you leave one location, you insert the FileRunner disk, hit a few keys, and within a minute all of the files that you need are updated for transfer to your other computer. I don't see LapLink and FileRunner as competing products. Rather, I need them both on all of my computers. ■

COMPUTER Of The Month:

Panasonic's CF-1000

RESOURCES:

Panasonic CF-1000, $1,699
Panasonic Communications & Systems Co.
Two Panasonic Way
Secaucus, NJ 07094
1-800-742-8086

From time to time a notebook computer comes along with features that really excite me. This month's machine is one of those. The basic description of the computer is not all that different from the competition, but the features set it in a class by itself. The Panasonic CF-1000 is a 386 running at 25MHz and supplied with 4MB of RAM, expandable to 12MB. But that is merely the briefest description. In fact, the chip that runs the unit is AMD's revolutionary new 3.3 volt model which means extra long battery life.

This low-energy CPU gives you between three and five and a half hours of use, depending upon how carefully you conserve power. But the kicker is that you can extend battery operation up to eleven hours by using an additional nickel metal hydride battery ($200) that fits in the same place as the removable floppy drive. Panasonic reasons that you may not need your floppy drive all the time—especially when you are away from a power source. So they have designed the floppy drive to come out, leaving room for an additional battery pack.

Nickel metal hydride batteries have advantages over nickel cadmiums. First, you do not to have to completely deplete the battery before recharging, which means you can always leave home with a full charge! Secondly, recharge time is a mere seventy-five minutes when the computer is not in use. The Panasonic CF-1000 has enough battery powered work time to let you work comfortably on your flight to Europe. Other computers will soon be arriving with this capability, but this one is here now. If long battery operation is important, this is the computer to look for.

Panasonic has designed its sophisticated power management software so that it not only extends battery duration, but also lets you configure the machine so that you do not have to exit your application before turning off the power. The computer retains your application and files in memory. The next time you turn the computer on, it will open to the application and files you were working with earlier.

But before I get ahead of myself, let me describe the machine a bit more fully. It weighs 5lbs. and is only 1.25" thick. Its sleek design and trim dimensions make it a breeze to carry around. The basic model comes with a 60MB hard drive. Each unit comes with Super-Stor disk compression software installed. This means that your computer will effectively have a hard disk capacity of 120MB. Panasonic has announced that soon this machine will be available with a 170MB hard drive, but no price has been set. The capacity of this model will also double because of the inclusion of Super-Stor.

When you open the CF-1000 and turn it on, the 9.5" VGA LCD is crisp and clear. If you are working in a permanent location, and choose to use an external color monitor, it is simple to attach through the VGA port on the back.

The keyboard is well designed. Panasonic has done what I wish all manufacturers would do: use the tried and true layout that works for typists. Separate cursor movement keys are included as well as PgUp, PgDn, Home, and End keys. And all of the keys are exactly where I would wish them. Still, if this keyboard cramps your style, you can attach a PS/2 keyboard of your choice.

All of the standard accessories are available. There are three modem choices. The top of the line speeds along at 14,400 bps ($500). A docking unit ($600) lets you use expansion cards. And finally, a carrying case will set you back $35.

The Panasonic CF-1000 comes standard with MS-DOS 5.0, Windows 3.1, and Super-Stor. Unfortunately, you will have to buy a mouse if you use Windows. This computer has many features, making it a first rate contender in the marketplace. ■

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OPTI 486DX2-50 EISA LOCAL BUS W/256K CACHE	555
OPTI 486DX -33 EISA LOCAL BUS W/256K CACHE	435
VEGA 486DX2-66 ISA W/256K CACHE	755
VEGA 486DX2-50 ISA W/256K CACHE	635
VEGA 486DX -33 ISA W/256K CACHE	515
ALI 486DX2-66 ISA W/256K CACHE	665
ALI 486DX -50 ISA W/256K CACHE	565
ALI 486DX2-50 ISA W/256K CACHE	545
ALI 486DX -33 ISA W/256K CACHE	425
ALI 386SX -33 NO CACHE	125
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PANASONIC KX-P2124 (24pin 320cps 80col)	315
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MAXTOR 7213A 213MB IDE HDD (15ms)	285
MAXTOR MX-7213S 213MB SCSI HDD (15ms)	315
MAXTOR MX-7245A 245MB IDE HDD (15ms)	315
MAXTOR LXT-345A 340MB IDE HDD (13ms)	445
MAXTOR LXT-340S 340MB SCSI HDD (13ms)	555
MAXTOR LXT-535A 520MB IDE HDD (13ms)	875
MAXTOR LXT-535S 520MB SCSI HDD (13ms)	885
MAXTOR XT-8760SH 675MB SCSI HDD (16.5ms)	1145
MAXTOR MXT-1240S 1.2GB SCSI HDD (8.5ms)	1495
COLORADO DJ-10 120MB TAPE BACKUP	185
COLORADO DJ-20 250MB TAPE BACKUP	225
COLORADO POWERTAPE 2.4GB TAPE BACKUP	1075

Misc.

HIGH RES. SERIAL MOUSE	$ 13
MICROSOFT SERIAL MOUSE	59
HIGH RES. TRACKBALL	35
MOUSE PAD	3
2400 BAUD MODEM	35
9600/2400 BAUD FAX MODEM	59
SMARTLINK 9600 EXTERNAL	195
SMARTLINK 14.4 INTERNAL	245
INTEL SATISFAXTION 100	115
LABTEC CS-550 SPEAKERS	30
FLIGHTSTICK	55
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ORCHID FAHRENHEIT-VA ACCEL. W/ VOICE 1MB	209
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DC-99 ISA IDE CACHING (UP TO 8MB)	125
ULTRASTORE U34F IDE CACHING (UP TO 8MB)	175
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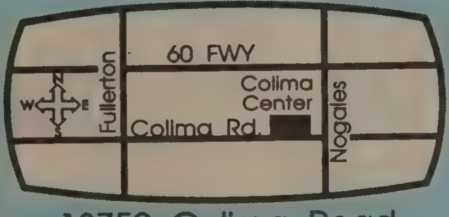
ADAPTEK AHA 1742AK EISA SCSI ADAPTOR KIT	415
VLB 32-BIT IDE W/ 2S, 1P, 1G	65
VLB 32 BIT CACHING IDE W/ 0MB (UP TO 16MB)	185



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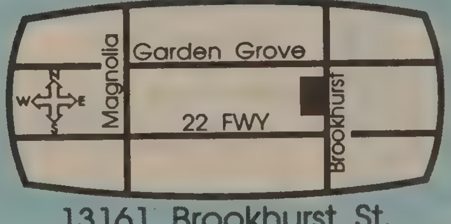

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SALE PRICE: $1465

CASH DISCOUNT:

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- Paradise Window-Accelerator w/1MB 1280 x 1024, 16.7M Colors, 16 Bit True Color
- IDE Dual FD/HD Controller
- 2 Serial, Parallel, Game Port
- 14" SVGA 1024 x 768 (.28) Monitor
- 101 Enhanced Keyboard

Motherboard Made By IBM

CPU	IBM48650	486DX33	486DLC33
MIPS	19.4	14.5	11.2
LANDMARK	114.88	111.5	107.2
NORTON	67.7	51.6	54.1

VESA Local Bus

- 170MB IDE HARD DISK, 13MS
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- 256K CACHE RAM
- 4MB RAM UP TO 32MB RAM ON BOARD
- 1.2MB & 1.44MB FLOPPY DRIVE
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- 101 KEYBOARD

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486DX-66	$1695

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ISA486

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- 4MB RAM UP TO 32MB
- 1.2MB & 1.44MB FLOPPY DRIVE
- 170MB HD
- DUAL IDE FD/HD CONTROLLER
- AT I/O: 2 SERIAL/1 PARALLEL/1 GAME
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- 101 ENHANCED KEYBOARD

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- 100 Sheet Paper Feeder
- Whisper Quiet
- 3 Year Warranty

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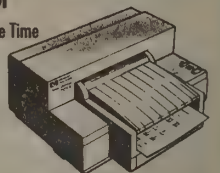
- 84 DOS Fonts
- Whisper Quiet
- 3 Year Warranty



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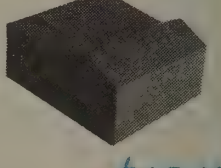

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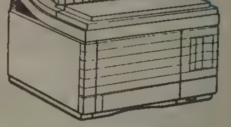

All Printers are Cash Prices Only.

386DX-40MHz

- 128K CACHE RAM
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- DUAL IDE FD/HD CONTROLLER
- AT I/O: 2 SERIAL/1 PARALLEL/1 GAME
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- 101 ENHANCED KEYBOARD

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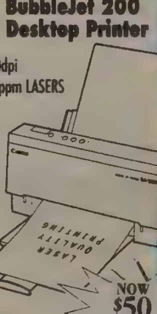

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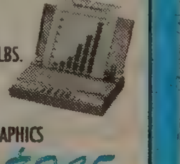

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BUBBLE JET
BJ-300
INKJET PRINTER
LASER QUALITY

- MANUAL FEED & SHEET FED
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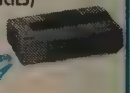
- 360 DPI > 15.2 LBS./19.4 LBS.
- ANY SIZE PAPER (ENVELOPE, A4 LEGAL, SINGLE SHEET, TRANSPARENCIES)
- EPSON & IBM EMULATION



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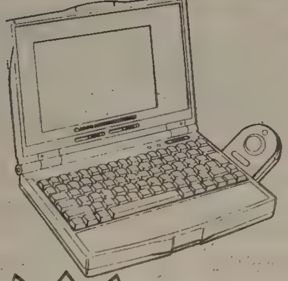

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486 Notebook

Built-In Bubble Jet Printer Two-In-One!

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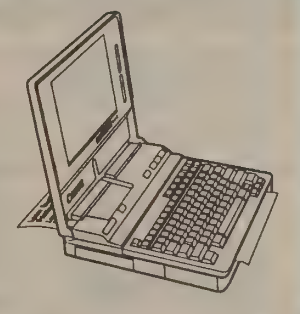

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486DX-33

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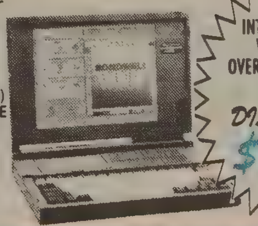

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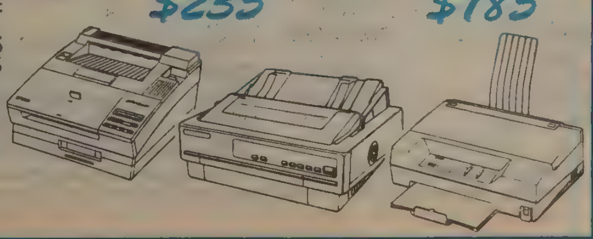

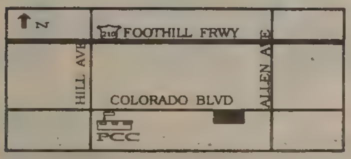

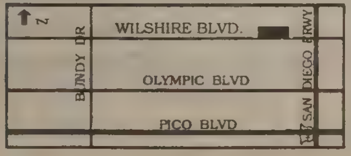

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80MB	$185
105MB	$195
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170MB	$235
210MB	$265
250MB	$305
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450MB	$495

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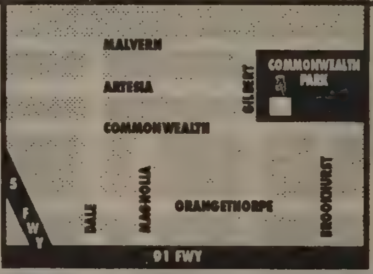

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John Wolcott is a free-lance writer for hardware and software documentation.

You're ready to make the move to running the business on Sun workstations and even doing your own Sun systems software development. Administration of a Sun system is not something you can really do very well without formal training. Plus, what about training for existing and new employees? Who ya gonna call?

THE SUN SYSTEM

A Sun computer system is built around a large, UNIX-based file server; good for a networked environment taxed by heavy CPU processing. Sun Microsystems continually upgrades its systems features. In December 1992, for instance, Sun released the Solaris 2.0 operating system, and many companies are shifting to this environment. Actually, this upgrade is a requisite to adding new Sun workstations to an existing system or running the newer Sun-based applications.

With over a half million users, Sun workstations are commonly used for engineering, large accounting databases, computer-aided design, military applications, and medical applications such as Magnetic Resonance Imaging. The list of major corporations using a Sun is equally impressive—they include Xerox, Hughes Aircraft, Pacific Bell, Pacific Telesis, Rockwell International, McDonnell Douglas, and UNOCAL. Sun training for the end-user is most often recognized as a necessity, and companies usually make the arrangements to provide their employees with training.

Sun Microsystems Computer Corp. has long offered training for users of their high-end business application systems. With regular revisions occurring in Sun systems and applications, study material is continually being upgraded to meet these needs. Effective system administration requires gaining Sun productivity skills and being trained on revisions as they evolve.

Karin Kohn, a system administrator for Pacific Bell, has worked extensively with database applications. When her job shifted to being a Sun system administrator, Pacific Bell arranged for the training. The choice of a Sun training facility, as with most Sun trainees, was dictated by course scheduling availability. She recently completed a five-day System Administration course at New Horizons Computer Learning Center in Santa Ana, California. Karin feels confident in her ability to administrate the Sun System.

SUN TRAINING COURSES

All courseware for Sun-certified training is developed entirely by Sun Microsystems with upgrade input from various Sun training facilities. Because a Sun system is not "self-taught," formal instruction is necessary to become anything more than a casual application user. Sun training features a "computer lab environment" with students learning "hands-on" at a Sun workstation in the classroom.

Before attending, it is a good idea to know the basics of using a Sun workstation. If you've previously dabbled in a UNIX environment, it's definitely an advantage. Sun training courses are tailored to four different categories of Sun users. The curriculum for Sun training addresses operation for the end-users, programmers, system administrators, and hardware maintenance technicians.

These categories, termed "Learning Paths," involve a series of courses directed toward having students obtain a complete set of Sun System skills necessary to operate productively in a professional environment. If you're new to the Sun environment, start your training with end-user courses before moving on to any system administration duties. A full year of end-user experience is recommended before taking on system administration.

CHOOSING A LEARNING PATH

Learning Path selection is fairly straightfor-

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ward based on the Learning Path titles. Complete course description and guidance for any of these Paths is available from Sun Microsystems or through an authorized training facility.

The End-User Learning Path starts with the fundamentals of SunOS and OpenWindows 3.0 for Users and moves to UNIX Video Screen Workshop, SunOS for Users, SunView, and OpenWindows. Also available with this "course block" are Shell Programming and Productivity Skills for Your Sun Workstation.

The System Administrator Learning Path starts with System Administration Essentials and System Administration and moves on to Shell Programming, Managing Your Network Using SunNet Manager, and Advanced System Administration.

The Hardware Maintenance Learning Path begins with Sun System Maintenance Essentials and continues with either SPARC Desktop or Deskside/Datacenter System Maintenance. This is followed by New Products Maintenance and specific product maintenance courses for Sun hardware.

The Programmer Learning Path incorporates the UNIX Video Workshop and SunOS for Programmers and progresses to courses for specific programming languages. Also available are specialty courses for graphics programming and system programming.

With over a half million users, Sun workstations are commonly used for engineering, large accounting databases, computer aided design, military applications, and medical applications such as Magnetic Resonance Imaging.

SCHEDULING SUN TRAINING

Sun Microsystems distributes a bulletin denoting the courses they offer. Sun training is available through a nationwide network of training centers. All applicants are screened for training qualification. Applicants who do not qualify as being ready to attend the Sun training courses are still eligible to attend but must sign a waiver acknowledging that, upon course completion, they may lack necessary skills to operate a Sun system effectively.

In some areas of the country, such as Southern California, Sun training courses are in great demand. To help alleviate the situation, Sun Microsystems has certified New

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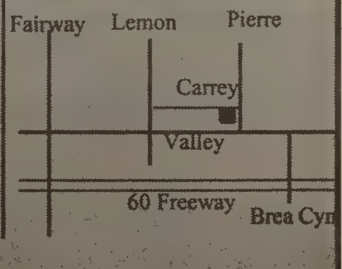

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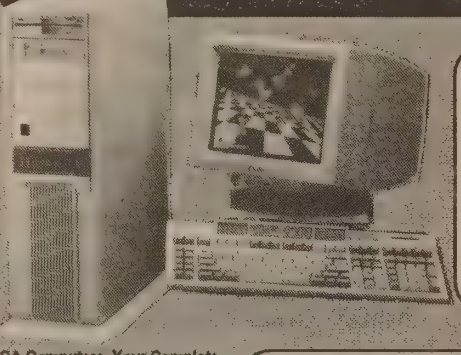

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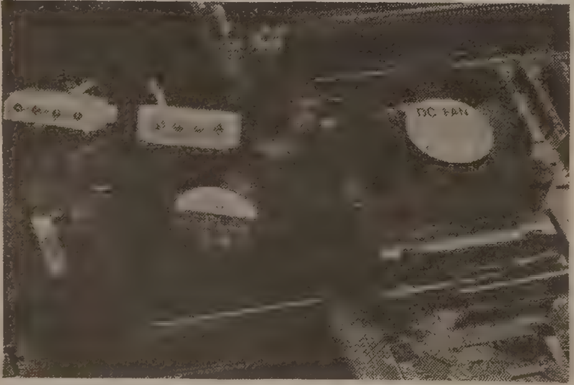

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Horizons as the first company, outside of Sun itself, to offer training. Scheduling for courses is immediate with classes starting within a few days of your call. Prices range from $500 to $1700 and must be paid in full before beginning training. The average "course block" of instruction takes five days to complete.

THE NEW HORIZONS TRAINING EXPERIENCE

New Horizons is a computer training organization with headquarters in Santa Ana. With thirteen training facilities franchised nationwide, they offer both classroom instruction at their offices as well as contracted on-site training. Although New Horizons does not offer job placement, job prospects for a qualified Sun systems administrator are good.

Having toured the New Horizons headquarters training facility, I was very impressed by their attention to training material development, large classroom computer labs, and an extensive support staff. The Sun instructors are trained and authorized by Sun Microsystems. Class sizes average ten to fifteen students. Currently, only the facilities in Santa Ana offer Sun training. The New Horizons sites in Dallas and Detroit are also planning to include the Sun curriculum.

Robert Hudock, an account executive for New Horizons, has a great deal of enthusiasm for the courses offered. Armed with extensive knowledge of course material, he feels that New Horizons addresses any aspect of computer training needs. Robert commented, "It really takes actually seeing the training environment to appreciate our facility. Our students are invariably pleased with what we offer."

Vince Rowe, an advanced applications training manager for New Horizons, exhibits the same level of enthusiasm. With an extensive background in multiplatform computer systems, the Sun workstation is no mystery to him. He is directly involved in tailoring course material and instructing students. Vince remarked, "The Sun system is far and away more difficult than any standard desktop computer. With Sun systems so widely used by major corporations requiring data intense applications, knowledgeable system administrators are highly in demand."

Timothy Blair, an assistant resource specialist for a large Southern California concern, is delving into Sun system administration at the request of his employer. He has been using a Sun system for some time and has worked on an IBM PC for about two years. He was ready to learn about the Sun system on an "operating system level." Having completed the introductory Sun training course at the New Horizons Computer Learning Center, though not ready for system administration, he feels comfortable with having acquired the basics in UNIX operation. He felt that the course introduction was very good, although course pacing was challenging at times. Timothy reflected, "The course material was well laid out. The training was far better than what I've experienced from other companies." Timothy was obviously pleased with his training. The training was a good investment in his intellectual capital.■

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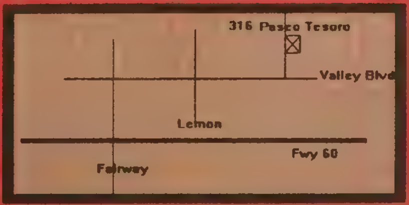

Rethinking

An Interview With Author Brenda Laurel

By Michael Robin •Photos: Paul Winternitz

The Human-Computer Relationship

> *"The traditional notion of interface has all kinds of ideas that are really wrong-headed—for instance, that the optimal thing is for a person to be able to program, because the relationship, after all, is between me and the computer. Therefore the ultimate interface for the computer is one when I write code. I don't think that's appropriate at all. It completely forgets the idea that what the relationship is between is a person, a participant, and a representation."*
>
> ***—Brenda Laurel***

Sometime in the mid- to late 1970s, Brenda Laurel, a happy but starving actor and graduate student in theatre, crossed over into the world of computer interface design. Partly to increase her immediate and long-term financial solvency by developing her technical skills, she accepted a job as a software designer and programmer with a startup software company, CyberVision. Her first work, on educational programs and interactive fairy tales, was done on a vintage desktop computer with a four-color, low-resolution display, which read data from a cassette and was loaded with 2K of RAM.

The transition from theatre to programming may not seem that obvious or smooth. But Laurel explains, "In 1977, playing games like Red Baron and Flight Cinema, I thought, 'Oh, it's just like theatre. There's action going on, I'm a character, there are other characters. Some of them are like human beings, some aren't. I get it.' It was like a no-brainer. It was quite natural to get into the business of designing an interactive version of Goldilocks."

From this beginning, Laurel's work has focused upon extending our understanding of computer-interface design, or more broadly, human-computer interactivity. This led to her involvement with several leading-edge organizations and institutions, including the then-newly-founded Atari Research Labs (where she first met Alan Kay), the Human Interface Group at Apple Computer (where she worked on Tim Oren's Guides Project, which involved designing agents, or characters with a point of view, to lead users through a database), and Telepresence (where she joined Scott Fisher to conduct R&D on computer-generated environments). Currently, she is working at Interval Research Corp., the Palo Alto-based company founded by David Liddle and Paul Allen to perform research and development in the areas of information systems, communications, and computer science.

After fifteen years in this industry, she is quick to observe that often what is obvious to her isn't obvious to people from a different background or discipline. These differences helped motivate her to write it all down. Her second book, *Computers as Theatre*, published in 1991 (with a new, paperback edition due out this summer), is "an argument for thinking of the object of our concern, the representation, and not the technology." In particular, she explores Aristotle's *Poetics* to develop her argument and suggests that drama presents a good model for understanding computer-human activity—how representations work, and how we might do a better job making these representations.

Nowadays, hardly a week passes without some relatively major announcement about these issues—graphical user interface, collaborative software, the battle over the various operating systems running on Intel-based PCs, and the evolving development of interfaces to computer communication systems such as the Internet, CompuServe, America Online, and Dialog. Interface design and the operating systems behind them are critical: How are people using their computers? What is the best way to design software to foster the useful development of human-computer activities? What are the next systems and how will they work?

Brenda Laurel and I met on a sunny April Fool's

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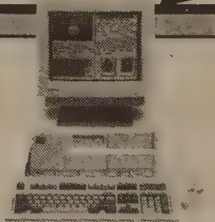

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morning to take a look at the state of interface design and where things are headed.

What I want to use as a jumping-off point is this quote of yours that the "concept of interface is a hopeless hash and it might be better to throw it out and begin afresh."

Throw it out. Drop kick it off the deck.

Before we do that, to let people know what's being thrown out, what are you referring to as "interface"?

What people mean by it is, specifically, what a "user" sees and hears—and whichever other senses are involved—from the machine out, and what they're able to do back, whether it's with the keyboard, voice or gesture. It's the I/O, if you will, and how that's designed.

There are all kinds of models for what a good interface is. One is direct manipulation, which says that you should be able to access and manipulate the "contents" of your computer by moving physical representations (or visual representations) of them around.

My issue with "interface" is that it's all predicated on the notion that the relationship is between the user and the computer. I don't think it's true. If you believed a similar thing about films, we would go see projectors instead of movies.

Another interface metaphor is "conversationality," where we say a computer should behave more like a conversation partner behaves. We then get into all kinds of interesting conversations about what conversation is, and what really goes on in conversations. Is it really sender/receiver stuff, or is it message-passing, or is it collaborative construction of "common ground"? Susan Brennan at SUNY Stony Brook has done some great work on this.

Let's talk about conversationality in terms of: I'm sitting here with my word processor. What would that mean?

Well, first, that would mean that you would be able to use things that were more like natural language. For instance, to query a database, you could say, "What is there about bananas?" instead of manipulating a folder until you find bananas inside of it, or selecting bananas from a long menu.

There're all sorts of fine points about conversation that we're just beginning to learn that make this a more interesting metaphor. For instance, how humans, when they converse with each other, get clarification when they haven't understood the other person, and how they repair errors in understanding. If you and I are talking and it becomes clear to me, from something you say or don't say, that you don't get it, that you haven't heard what I meant, then there are all these strategies that I might use to correct that error. As we begin to think about modeling those kinds of things, the conversational metaphor gets stronger and stronger.

My issue with "interface," and the reason I made that statement, is that it's all predicated on the notion that the relationship is between the user and the computer. That's just an assumption that we make. I don't think it's true. If you believed a similar thing about films, we would go see projectors instead of movies. The relationship isn't between me and the technology. It's between me and the content, or sometimes it's between me and the author of that content, or the presumed author, or between me and some semi-autonomous agent, some entity that's part of the representation of what's going on there.

The computer as a tool to get a task done.

It is a tool, except that as Alan Kay described, it's a meta-medium. That's as good a way to describe it as any I can think of. It's a tool that makes representations, and those representations could be representations of tools, or experiences, or environments, or activities. It's a representation-making machine.

"Computer as inherently interactive" is all the rage. In your books you draw a nice distinction between participation and interaction—getting the person to be more a part of what is going on.

The biggest challenge about this medium is re-understanding authorship. For over two thousand years, authorship has meant "one person or a few people create something, and a lot of people look at it and respond to it." Interactivity is an extension of that; it tries to accommodate some choice, but still maintains control over the shape of the whole.

What's called for here, and what we'll see in the future, is that we have to give up on that idea. It's much more about collaboration, synchronous and asynchronous. The paradigm underneath it all that's changing is that the notion of hierarchy—top-to-bottom, one-to-many, and control-and-command—gets replaced by a paradigm that's more like what a biologist would describe as "emergent behavior."

This is how we've come to understand bird flocking and fish schooling. There's no leader who's mysteriously communicating with everybody else what the shape of the whole ought to be. The shape of the whole emerges from each individual's behavior, which is so intimately related to the behaviors of other individuals that a form emerges out of the interactions among all the members of the group and with their environment. That form is often very beautiful and intricate. It's not like the choices are between top-down form and chaos; the choices are between top-down form and emergent form, which kind of comes from the bottom up.

The challenge of authoring then becomes one of understanding how this works. How do all the people on a network relate to each other so that some interesting forms and structures can emerge? What kinds of materials do we need to lay around for these guys, or environments where this emergent stuff can happen? It requires the absence of some kinds of constraints and the presence of other kinds of constraints. You can learn almost nothing about this from traditional notions of authorship or command-and-control structures.

This is hard to talk about, but I think that it's a change that's happening on almost every level in human culture right now. This "paradigm shift"—I hate to use that phrase—is from hierarchical thinking to thinking about emergent form and structure, emergent patterns and behavior. Mitchell Resnick at MIT has done some beautiful work in this area, by the way.

Can you say a little bit about how it might look for an individual to sit at their computer with a word processor and a database?

Well, my head has not been in word processing for a while. It's hard to think about it. [*laughs*]

I guess the example I would propose is a scientific visualization problem, or any kind of visualization problem where an architect is trying to understand a design, or a chemist is trying to understand some behavior of a molecule or a biologist is trying to understand the behavior of a species or an organism, where the ability exists to go back and forth and interact with the representation in a very flexible way. The whole notion of scientific visualization is that if I can create alternative representations of data, eventually I may hit on one in some other sensory modality, or some combination of sensory modalities, where suddenly a pattern jumps out at me. That's an example of what I mean by emergence in a person, a single individual working with representation.

You have worked a lot with games—how might this new paradigm look for games?

These are new thoughts for me; they are not well formulated. I'm just starting to think about it in a different way.

But in terms of gaming, if you look at the difference between a MUD and a canned adventure game, that is the essence of emergence. It's clear that in an adventure game, not only are you highly constrained in what you can do, at least in the traditional kind of adventure game, but you also have to always be changing gears between slaying the dragon and checking your inventory to see if you have a sword and doing all these meta sort of operations. Well, in the world of MUDs, it's not optimal yet, but there is the capacity to assert the existence of things and then to use them, in collaboration with other people who might be in on the game, and in relationship to the world that is already constructed there by other people.

Could you be a little more specific on what a MUD is and how emergent structures might manifest themselves?

There's been an explosion of MUDs over the last two years. Originally the acronym stood for Multi-User Dungeon. Now I think people are calling it Multi-User Dimension.

In 1988, James Aspens of Carnegie-Mellon invented something he called TinyMUD. He created some parts of a world with rooms, and connections among rooms and objects that you could look at or touch or use in various ways. But he also created a facility—a very easy facility—where people could do two kinds of things. One is to look, talk, pick-up, or use whatever was there, and two, to make or assert the existence of spaces that were connected to those existing spaces; and to say how they were connected and to constrain what might happen.

In an adventure game, you get to be the wizard. It's very constrained, and it's all there for you ahead of time. It is a matter of how you combine the pieces. This is much more like a picture-puzzle than Legos. A computer game is a little better than that, because you can put the puzzle together in a lot of ways. But in MUD environments—what I would call emergent game architectures—you're also getting to invent pieces. It's much more like Legos, or clay, or grabbing a handful of walnuts and saying, "OK, this is my army."

That hooks into the work I've been doing the last couple of years with children and how children play. I am an actor, and used to getting immersed in a very disciplined context and environment, having lots of fun there. But children play very differently. They make assertions to each other, popping in and out of tense and in and out of character. But it's all very seamless and fluid—a process of assertion and witnessing. This is very different from the kind of structures we know how to make when we are making top-down representations.

For some reason that makes me think about a comment Isabel Allende made recently about her new novel, that she writes half of the book and the reader writes the other half in their imagination.

If you look at the nonlinear fiction of Borges and those other guys, and she's a person that I'd place in that category—by intentionally doing poly-linear things that are not necessarily chronologically or causally organized like the traditional western narrative, the reader gets invited to participate in another level. Joyce did this all along.

A way in which you get to participate is to let you decide what's salient, how events are ordered, and how they might be connected. A lot more is left to your imagination. But if the materials are lousy, a bad author could write something and you could say, "Give me a break; this isn't art, this is just pain."

So where the genius of authorship remains is in providing wonderful materials. In the world of books this translates into interesting characters and environments with lots of potential. In the world of participatory media you certainly have that, but also it's a matter of providing easy facilities for this sort of fluid, collaborative, assertion-and-witnessing or whatever other paradigm you might want for how actions get defined. That is what the "interface problem" becomes. In other words, it means helping people participate directly with the representation in ways that don't take a lot of cognitive overhead.

> There are certain kinds of discourse, and therefore certain ways of thinking, that require the medium of writing an extended argument; they will vanish from the human species if we become only video-literate, or only able to act in an email context where everything is quite ephemeral.

Games have been a leading factor in computer interface design. What sort of new things can you see trickling back to what people use in their everyday tasks? Does groupware offer a good place to look?

First, I want to say to your word processor question, a word processor is the representation of a tool that a computer can support. Maybe it can't get any better. I made some comments in my book about how I think word processors ought to change. But in the case of word processors, this emergent pattern stuff probably doesn't make any sense. A word processor is a task-oriented tool, or a process-oriented package of tools. We need to distinguish between the content of a particular representation and the nature of the media.

Using a computer has changed the way I write, just as email has changed how I communicate with people. What's next in our processes of communication as the technology changes?

I don't know. You're right, it has completely changed the way we think about writing. One question is, will the notion of documents as ways of formally representing information among people persist?

If the idea of documents persists, then we will find familiar features in word processors in the future. I really hope the idea of documents persists. In this way I agree with Neil Postman—there are certain kinds of discourse, and therefore certain ways of thinking, that require the medium of writing an extended argument; they will vanish from the human species if we become only video-literate, or only able to act in an email context where everything is quite ephemeral.

Postman's argument is that in media where information is intrinsically ephemeral, television being the most extreme example, we're no longer able to do certain kinds of extended argument, reflective thinking, and analysis, because the medium doesn't support that activity. That's the argument that he puts forth in *Amusing Ourselves to Death*. That's the danger that he sees in television replacing other kinds of discourse.

Getting back to the question of the relationship between games interface and the workaday world?

How will this business affect us in everyday activities? Well, now for instance, there's a MUD in development for astronomers, where they're using the conventions of MUDing—i.e. defining a physical space, the room with a telescope, the room of equations, how this is hooked to that, etc.... In a MUD context you are in this space with other astronomers as a place to have discourse about astronomy. This becomes a really robust alternative to an astronomy conference on a system, for instance, like The WELL, where you would have the usual basenote and responses logged—a sort of forced linearization.

The trade-off is, over in MUD-land, it is more ephemeral, unless you're capturing stuff and saving it as files. It's more experiential. But the theory is that the sense of shared presence in this virtual space enhances collaborative work. It helps people communicate with one another better than in the forced linearized conversation that you get in a traditional net conference. Linearity is temporalizing information, saying, "We will read these from one to ten; we're going to linearize this dimension in time." What a MUD says is, "No, the dimension we really care about here is space. We are going to spatialize this conversation, so when you're in this room, you can deal with this topic, and when you're in that room, you can deal with that topic; you can go from here to there and back and forth, and you can leave a representative of yourself over here or a virtual tape recorder, and all of this stuff can go on at once." So I actually think that will change the way a lot of collaborative works gets done.

It seems to me that what you are really doing is calling for a redefinition, or re-conceptualization of human-computer interaction.

Right. I think we'll look back ten years from now and say, "God, wasn't that goofy that we thought that these things had to be made in little boxes and screens with keyboards and sit on our desks? Isn't that kind of funny, a historical funny thing?"

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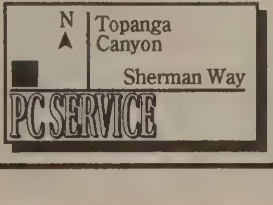

What is going to replace them, handheld devices...?

I don't know. I don't even know if I want to get into that argument. The thing most people agree on is that the computing power, the kind of representation-making/augmentation that computers provide, will be much more distributed through the environment, and often invisible. So with my little kitchen computer (a Mac Plus), finally I won't have to replace the keyboard every three months because it's got bread dough on it. I'll just be sort of speaking to the kitchen about the recipe, and I'll be hearing the recipe as I'm preparing it, instead of having to run back and forth and look at a screen.

There's no reason why there has to be a device physically present or visible. The relationship is between me and information. And maybe in some advanced state between me and some computationally supported expert who can help me by giving me advice about how to cook this new dish. Laurel's smart kitchen!

Isn't that off in the future, George Jetson type of stuff?

No! It is not off in the future. We can do it right now. It would be kludgy because natural language processing is not great. But that's coming along pretty fast. If I had $5,000 to spend on it I could build that system with what exists today. The only problem is that I would need to understand the constraints of the parser. And that's a pain. [Parsers are programs that try to make sense out of strings of words by using rules about syntax and grammar.]

> There is information in structure, there is bias in structure. The way an encyclopedia database is categorized, the way things are chunked and what's subordinate to what—that is the point of view. There's no such thing as objectivity.

In the scenario I just described, the bottleneck is natural language processing, and there have been a lot of advances in that area in the last two years. But it's not pie-in-the sky; it's not George Jetson. I could have built it ten years ago. But I would-have-had-to-talk-like-this...[*talking very slow, over-enunciating*]... because we weren't able to do continuous speech recognition very well.

In *Computers as Theatre*, you say that one of the key cultural issues is content and access of information. One of the things I thought about when I read this was the structure or authoring of databases. Large databases, for example, come out of large corporate structures and reflect that particular hierarchy. So if you want to build a database or anything else for another structure or environment, you have to be very careful.

Right, because there is information in structure, because there is bias in structure, because the way, for instance, an encyclopedia database is categorized, the way things are chunked and what's subordinate to what—that is the point of view. There's no such thing as objectivity. So when Grolier says to you "so here it is, this is just objective fact," and they print the author's name in little tiny letters, because you are not supposed to care because it's objective. It's a western hierarchical notion of epistemology.

I think one of the things that is happening across the world is what Seymour Papert called "epistemological pluralism." This means that we are beginning to accept the notion that there are many different valid ways of knowing about the world, and that science, or a western analytic view that comes from our culture, is not intrinsically any more valid than a narrative produced by somebody in a wildly different culture.

Tim Oren had a project at Apple that Abbe Don and I worked on (which gets talked about in this book). He said, "OK, instead of finding stuff in a database in terms of these hierarchies of categories, which is how encyclopedias would do it, let's create some agents that have explicit points of view." Tim figured out how to represent what each agent was interested in as a kind of vector in the topic-space, which turned out to be a very elegant solution to a complex problem—that became the guts of what we called Guides.

In the Apple project, we were using a database about Westward Movement in America. The Guides found information according to their points of view, for example, from the point of view of a Native American. We had to add some new material too, to support multiple points of view—there's stuff in there written by Red Jacket and Black Elk and other people that you're not going to see as authors of encyclopedia articles.

So one way to think about redesigning databases to support multiple points of view, or multiple epistemologies, is to organize them by point of view. In other words, information can be presented to you by an agent that represents a particular point of view that is not "neutral"—we even designed a way for you to create new agents and points of view by specifying the kinds of things they might be interested in, by topic and media type. I think information providers of the future are going to be responsible for more and more diverse sources of information, and need to give people the means to filter and select from that vast sea.

What is the influence of culture on interface design?

We could say that in the globalist view, just like English has become the standard of the business community throughout the world, Windows or desktops or whatever the next thing is will become the *lingua franca* of the business community throughout the world in human-computer interaction. And that may well be true—I'm not so concerned about the business community. I've not been involved in computing for the business world in most of my career, and in the job that I have now, I'm looking at the world of people in private and public spaces, as opposed to people in the workplace.

So in that case there are certain aspects of magazine publishing that are sort of global. It's on paper, it includes printed pictures. In America you start at the front, in Japan you start at the back, but there are these sort of conventions that have to do with magazine-ness. Now, within that there are all sorts of differences that have to do with layout and illustration and typography, but there are many more people in the world that probably don't have magazines and don't read them and never saw them.

If you want a communication medium that actually has the capacity to link up everybody on the planet, you have to give up the notion that there can be a single interface. The differences among cultures are too great. I believe that the interface, that is the mode of interaction between me and any given representation, whether it be the representation of a database or the representation of a virtual world as in a MUD or the representation of a computer game—that interaction has to be soft, and it has to be shaped through the process of my fooling around with it. The best example I can think of is a famous experiment in public space design—instead of laying down sidewalks in a public space, the architect sat back and waited until enough people had walked around this grassy space that it had footprints on it, and that's where they put the sidewalks.

We need to think about designing systems that have that same kind of softness about them so that there's easy entry, there's not a steep learning curve, and we can begin to see footprints. The WELL could be light-years ahead of where it is now if they were looking at footprints instead of forcing PicoSpan and UNIX down our throats; the amazing thing is that people put up with it and you still get emergent behavior. Look at the cultural diversity on The WELL—from within an incredibly brain-damaged iron maiden of an interface, there's this mushrooming cultural diversity. You can say that about almost anything on the Internet. I don't know of a good interface yet to Internet communications. There are some that are better than others, but by and large we have not solved that problem. Yet, people put up with it and still end up creating diversity.

What I'm saying is that if we want to design good interfaces that really are about global interface, and not just about global access for male business people, or people with resources, or people who speak English, or whatever, then we have to give up the idea of a universal interface. We have to think about interfaces as clay, or things that are soft, that you imprint by working with them, that are dynamic,

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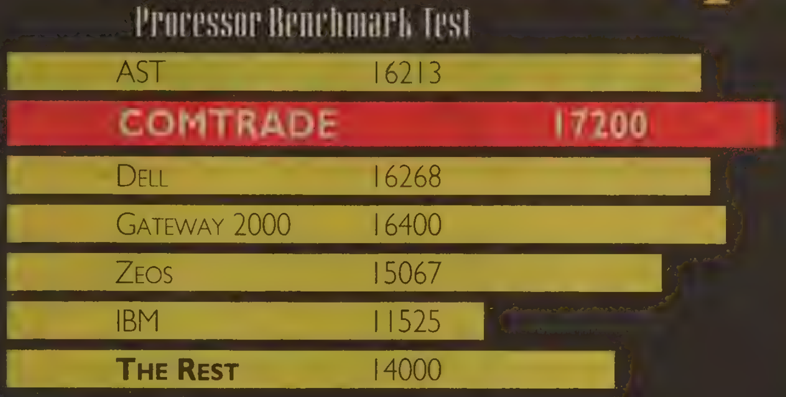

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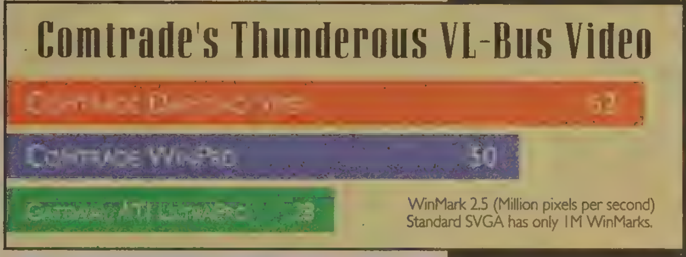

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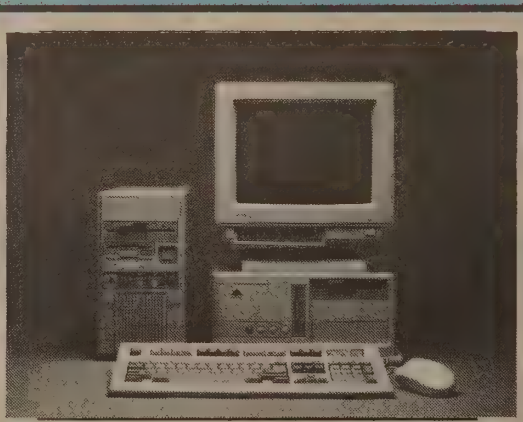

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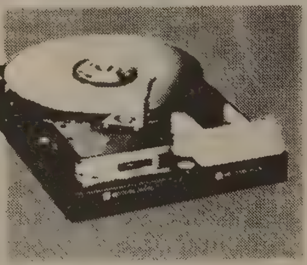

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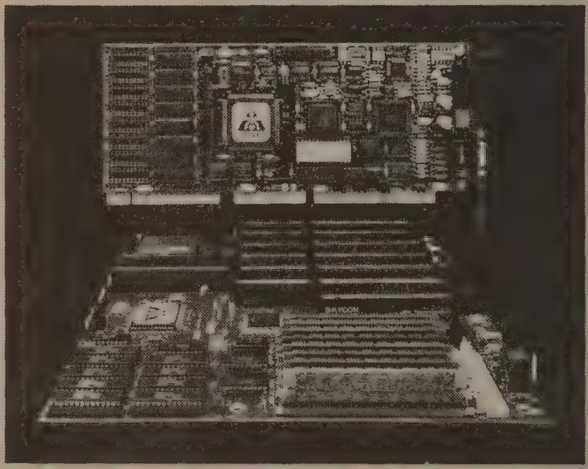

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Continued from page 54

that change as you change, that change as the subculture of which you are a member changes, etc.

That philosophy is sort of guiding the work that I'm doing right now at Interval, trying to look at how diverse people who do or might use computers really are—to give up the idea that accommodating diversity is about teaching this or that population to use Windows and desktops. That is clearly the wrong answer. Computer literacy is a really stupid idea.

So what's needed, what should we be talking about?

We should be talking about designing soft interfaces, interfaces that are imprintable and customizable, in really low-overhead ways for people in groups.

Making computers that are human literate?

Exactly. The question is who has to accommodate to whom. Computer literacy usually means that I say to you, "If you want to drive this car you have to be automobile literate, you have to open the hood and tell me what everything does, be able to take it apart and put it together again, and adjust the carburetor, and if you can't do that then you can't drive it." That's what we mean by computer literacy. And it sucks and it's dumb.

If we use the computer literacy approach to helping girls with computers, for instance, then we would have these wonderful situations where we would say, "Now girls, we know this isn't very natural to you but we want you to learn DOS. Just think about DOS as this Barbie story with sugar coating."

Sorry, this is offensive. It's our job as the people who make technology to make computers human literate. I just think we have to give up this idea that there's some global interface. It's more likely that there's a global interface Play-Doh-thing that we might come up with.

That may be true, but we can't overlook the situation that cyberspace is still a predominately western place.

Unless you are talking to an Australian Aboriginal. I've had conversations with Aboriginal people about virtual reality, and they find it completely understandable and quite obvious. They are amused by the fact that we white guys have to build these big machines to dimly glimpse what is vividly part of their consciousness all the time, with their understanding of dream-time.

My point is that there are constructs in every culture that could be easily accommodated by interactive technology in a way that makes it accessible. At least at the entry level. It is the entry-level area where you need to look for these cultural hooks.

Can we talk about your current work at Interval Research?

That's all I can say about it. My boss will be very unhappy if I say any more about what I am doing than I just did.

You talk about working with girls and women; some would argue that this isn't an issue. Why is this an issue and what are you trying to do with it?

Well, it's an issue for me personally because I am female and I have a right, I believe, to be as empowered as a male by what we as a species have extruded here. It's about equity. It's about accommodating difference, not just sex difference, but cultural difference and individual difference. Even if we were both male there would be big differences in the way that we understand the world and the strategies we use for navigating space, for instance, or thinking about information or solving problems. There's a whole lot of implicit cultural imperialism in the software and operating systems, in interfaces, that we made in the '70s and '80s, and now it's time to make room for lots of new points of view.

If the "girl" problem was easy to solve—that is, to make computers attractive and accessible to girls—the game industry would have solved it. There's too much money on the table, half the market, right? I don't think it's an easy problem to solve, I think we have to change a whole lot of basic premises about how we think about designing software and interfaces and operating systems in order to address that problem, whether it be girls or old people, ghetto kids, or native Americans or Chinese farmers. Can't just put a different coat of paint on it.

Your book was first published in 1991. You added a new chapter in the revised edition due out this summer. Looking back, what was right and what was wrong?

My basic premise about representing action has not changed. What I tried to do in the chapter I've added for the new edition is to look at the book and the thinking that went into it from the perspective

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of what's happened in the last two years. There have been profound changes in culture all over the planet in the last two years. And so in the new chapter you will see this idea of emergence, for instance.

I think what changed most for me, between when I finished the book and now, is that I had this epiphany that is hard to articulate. It is that the top-down structuralist approach has really limited usefulness. I think that everybody who designs a computer or a piece of software needs to know what is in this book. I also think that is not all they need to know. We need to be grounded in some theory of representations that makes sense, because many excellent technical people don't have a clue about what representation is and how it works.

> The model of mind that is reified in the computer is a disembodied mind. It's a model of rationality and logic. If this technology is actually going to augment us, in the way that Engelbart hoped, then we need a more appropriate model of human thought and process.

Why is interface important and to whom? Why is any of this important to the person who simply uses a computer to get their work done?

From the beginning we've defined computers as extensions of our minds, and we've tried to model them after our minds. But the model of mind that is reified in the computer is a disembodied mind. It's a model of rationality and logic.

If this technology is actually going to augment us, in the way that Engelbart hoped, than we need a more appropriate model of human thought and process, and I think we're getting there. The reason VR is important is because it says mind doesn't exist without body; the senses are part of the mind and we have to take our bodies with us. VR makes an assertion about what the mind is, about what human intelligence is. And sure enough, the minute you bring the body into the picture, a couple of other things show up. One is what we used to call intuition. Why is it that when you put somebody into an immersive scientific visualization environment, where there are things that they see and hear, and they are moving their bodies, and they are using all their senses, that they will perceive patterns and be able to think about things in a different way than if they were just looking at numbers? The answer is that the whole is more than the sum of its parts, and that's what we used to call intuition.

The other thing that sneaks in, between the cracks, when you add the body and senses, is passion and emotion. That stuff gets in a lot easier when you can touch it and taste it and feel it and smell it and see it, than if you're just looking at it. Especially if you're just looking at it in text. And what I said in the book, and what I believe to be true, is intelligence is no more simply reason than language is simply words. Most of the content of what you and I are saying to each other that your readers won't see has to do with tone of voice and pause and volume, what we call prosody. So language is words plus prosody. Well, intelligence is reason plus passion. It's feeling strongly about things, it's having convictions. It's having emotional connections with ideas and actions in the world. I think that's true. I think buttoned-up-objectivity is dead or should be soon. So that is why I think this is important. ■

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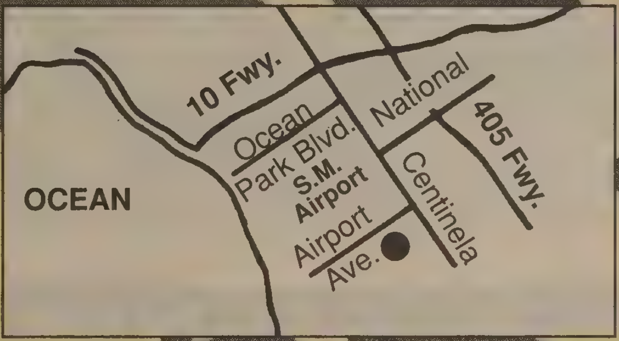

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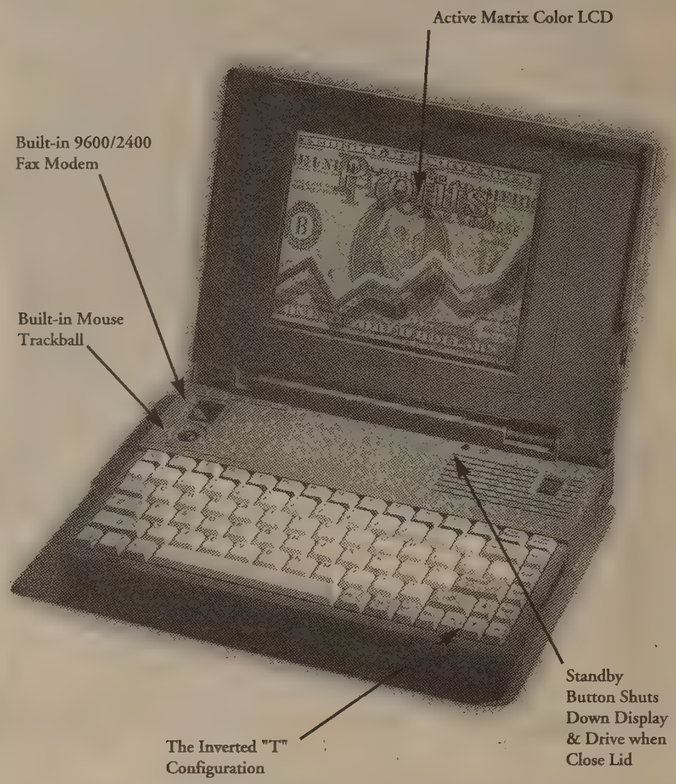
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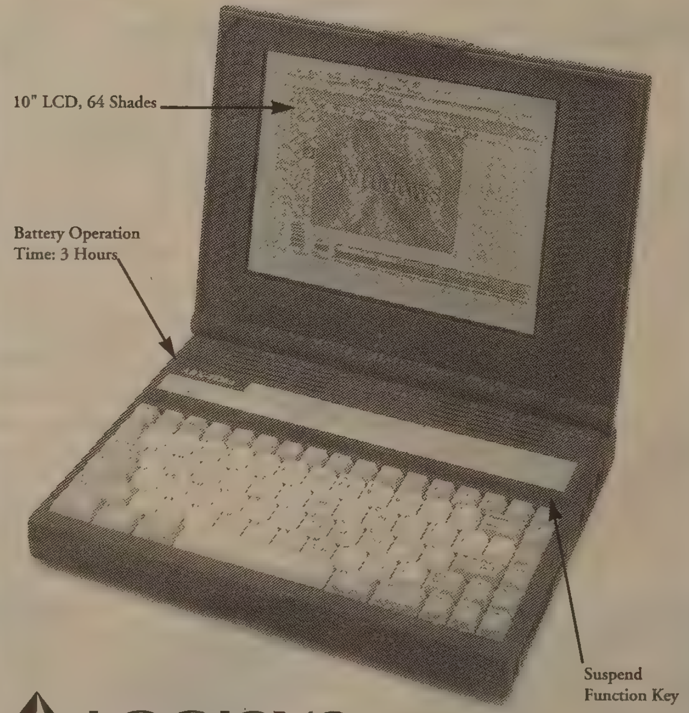

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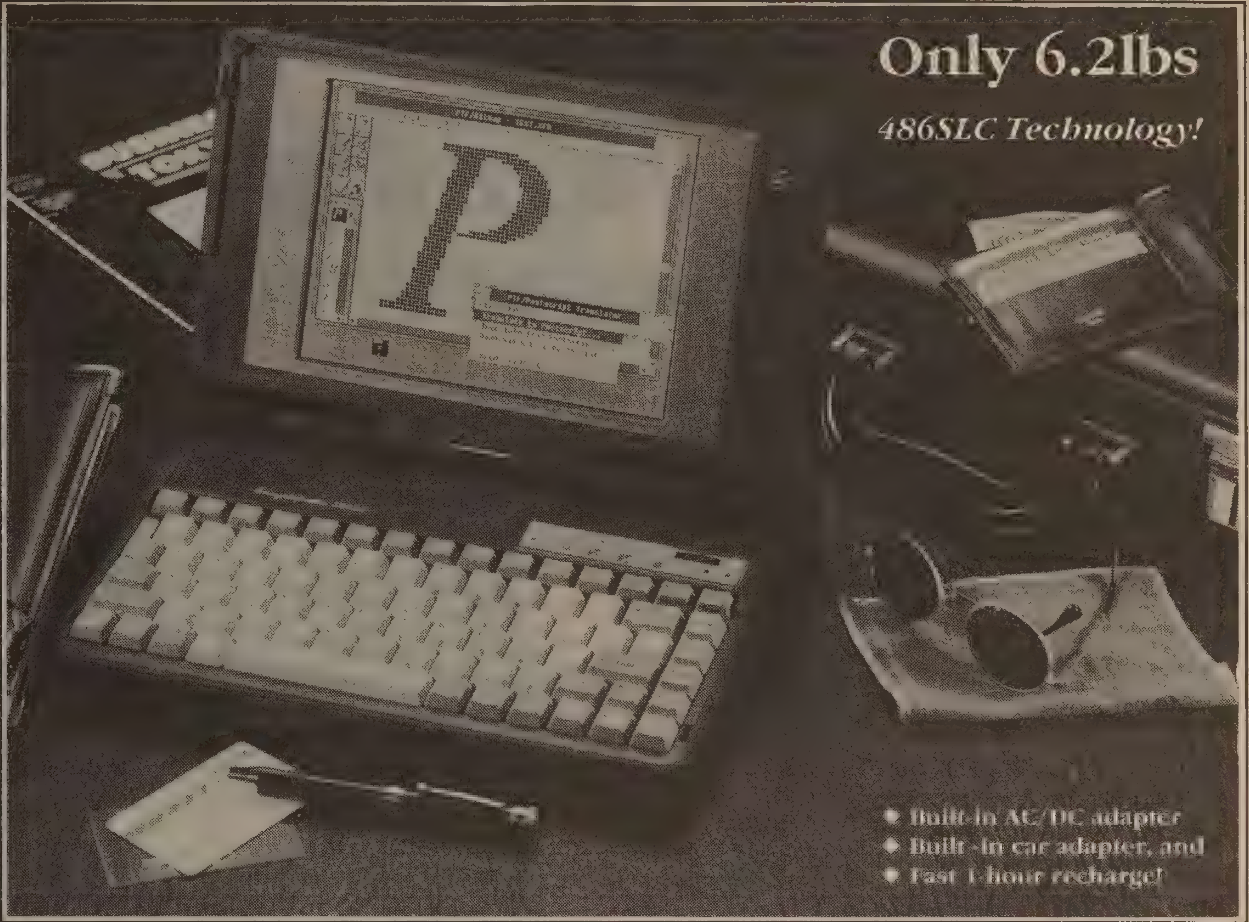

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Paradox: The Paradigm Shift

Borland's All-New Paradox For Windows

BY BIRRELL WALSH

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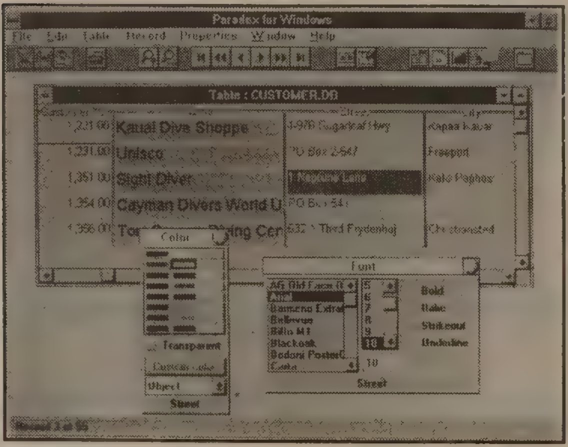
With Paradox for Windows, Philippe Kahn has come out swinging in the Windows database war. This is a product like no other: a huge, robust Windows native with exquisite graphics and a fine interface design. Professionals are going to love what Paradox for Windows makes possible. But there are so many—well, paradoxical—things to say about Borland's Paradox for Windows that the reader is due a summary:

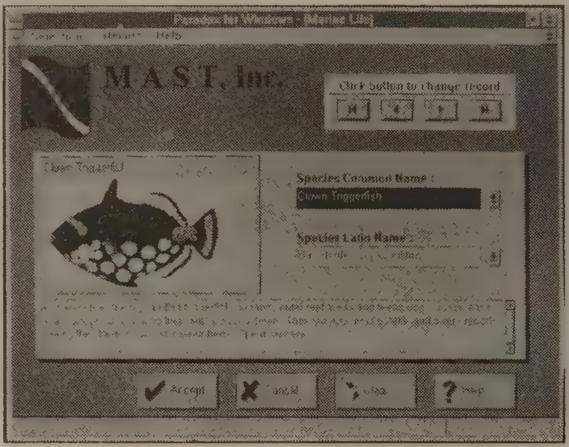
It's *big*. It's not like the old Paradox, so be prepared to learn new tricks. It is really a Paradox-cum-dBASE, as it works with both in native format. The Paradox Application Language is entirely new. Its object-orientation makes it very powerful and sometimes very annoying. It is lovely for designing an interface, and for managing output. It has odd interactions with some other programs. It may be the first twenty-first-Century database.

IT'S BIG

"Big" means that it will run grudgingly in four megabytes. I had four megabytes of RAM on my 386/33 system, and I tried running Paradox for Windows in that amount of memory. It was extremely slow and awkward—considerably slower than my previously installed Paradox 3.5 for DOS. When I upgraded to 8 MB of RAM, everything speeded up, and Paradox for Windows outperformed Paradox 3.5.



Even with eight megabytes installed, Paradox for Windows wants a lot of it for its own exclusive use. I was able to run Microsoft Word for Windows at the same time, so the average amount of Windows traffic will probably coexist on a computer with eight megabytes of RAM. Don't expect to have another huge program running at the same time. Do not expect to run Paradox for Windows in less than 6 MB. Do include RAM-upgrade costs in your estimates of the expenses of changing to Paradox for Windows.



A DATABASE FOR ALL YOUR DATA

As Borland now owns dBASE, the hordes of the Kahn decided to make Paradox for Windows capable of working with Paradox tables of various formats, and all dBASE databases, without conversion. This means that if you have data that was recorded in dBASE format by dBASE III or IV, or by FoxBase or any of the supersets of dBASE, you can work with that information in Paradox for Windows without conversion. The file format remains the same. This can permit a company to adopt the software without having to change data formats.

For a number of years Paradox users envied dBASE users their access to the MEMO field, in which one could store a huge amount of text. Now Paradox for Windows has memo fields (unformatted text), formatted memo fields (RTF with font, color and spacing information), binary (data Paradox can't interpret, like sound), graphics files (PCX, BMP, EPS & GIF), and OLE (dynamically connected to other application) fields. Binary, memo and formatted memo, OLE and graphics fields are in "binary large object" or BLOB files, kept separate from the main table. An SQL engine will soon follow. There are no forms of computer information that cannot be accessed from within Paradox for Windows.

BUILDING AN INTERFACE

When you look at Paradox for Windows' first screen, you find a set of icons along a bar at the top. Clicking one of those icons will let you design reports and on-screen forms with a superb set of design tools. As you choose which kind of object to build, the iconbar changes to provide you with the tools you need.

Because Paradox for Windows is object-oriented, each thing you see on the screen is an object with a set of characteristics. Borland uses the right-hand mouse button to open an object inspector. Don't like the look of that field? Click on the right mouse button and a list of all the properties of the field appear—color, style, labeling, and so on. From this menu and its daughters you can change any of the field's properties without ever moving the mouse from the area where the field is situated. You can change buttons, fields, on-screen text, the screen itself.

Objects can be included within other objects. As you design a form, you can insert graphs that change in real time, or graphic objects from a database, or even graphics imported from outside. You can add cross-tabulations that Paradox for Windows will build for you. The graphs, the crosstabs and the graphic fields are also objects, and their

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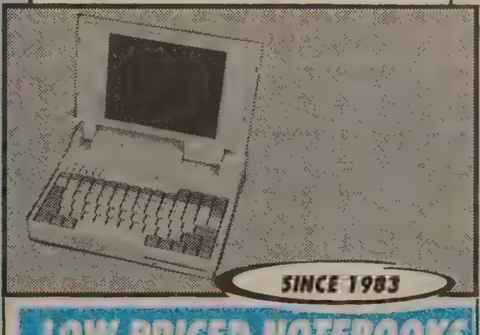

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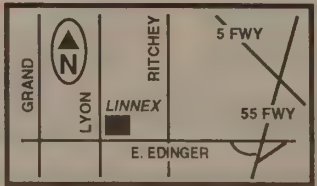

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Other—often unexpected—objects can be included. Database tables can become member-objects in forms. You can simply include a table in a form and use the form to allow editing of the table's values. This is one way to build a quick and dirty data-entry system. Another is to use the "QuickForm" option. All the fields of the database appear in order on the quick form. You can use the form as is, or move things around and then save the customized version.

Forms and reports can be interchanged, so a well-designed screen form can become the basis for a printed report. You can build "What you see is what you get" invoices by copying a screen form into a report design.

Instant access to all the properties of everything simplifies and speeds the design of screen forms. Forms and reports can be interchanged, so a well-designed screen form can become the basis for a printed report. You can build "What you see is what you get" invoices by copying a screen form into a report design.

The design-test-redesign cycle is simplified. On the design icon-bar there is a "run" button that will make the form run as it will appear to the user. And on the "run" icon-bar there is a design icon that allows you to return to design mode to make changes.

When you have perfected your form, you can create a "delivery" version of it. The "delivery" version works just like the run version you have been using to test your design, but the design tool is not available and the user cannot modify the form.

POWERFUL SCRIPTING LANGUAGE? YES. EASY? WELL...

While the friendliness of Paradox for Windows to different database types can make for smooth adoption on one front, the in-house code-maintainers will be whimpering. The PAL code they developed over the years for DOS versions of Paradox will not run in Paradox for Windows, nor will dBASE code. Although there will be chunks of transferable code, most applications will have to be completely rewritten.

Not only rewritten, but re-thought. Paradox for Windows is completely object-oriented.

Object orientation means that the program is no longer considered as one monarchy, with a single ruler and homogeneous communications among the various parts. Instead, an object-oriented program is set up as a federation (on a good day) or a United Nations (on a bad day) of semi-independent objects that communicate among themselves by messages.

The good news is that Borland has provided extremely intelligent objects, and very easy access to them. When you click on a screen object, one of the menu choices is "methods." "Methods" are object-jargon for procedures that will run in response to various messages. And for everything you want to do in Paradox for Windows there is some object that knows how to do it. The question is, which one?

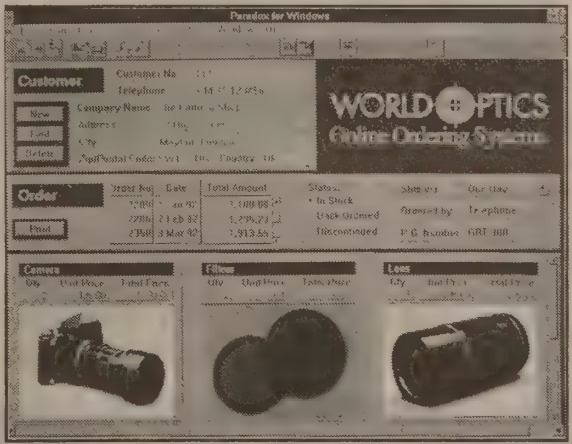
Every programming operation in an object-oriented program (OOP) must begin with one question: "Which of the many objects will handle this?" Does the table print itself? Does the form in which it is embedded handle printing? Does Paradox for Windows do it? How can one object—perhaps a button—get another object like a field to change its value? How does an object decide if another object is entitled to give it messages? If this sounds to you like bureaucracy, you're right. A bureaucracy-like confusion about "who's responsible" is the plague of OOPS.

The value of OOPS is mostly for developers—people who must reuse designs many times. They can build a general solution into an object, and reemploy it in dozens of different contexts. The grief of objects is concentrated at the beginning of the learning process. By adopting an object-oriented approach, Borland has made Paradox for Windows less approachable for the occasional or small user than its predecessor in the DOS world.

Paradox for DOS was famous for its gentle curve between non-programming and programming. In a DOS Paradox project, when you discovered that you were doing something frequently, you could use the built-in macro recorder to record the process into a macro. Macros could be glued together to make super-macros, or included in a DOS-Paradox PAL script when you began to write them.

Paradox for Windows has no macros. Any activity you wish to automate must be done in ObjectPAL. There is a considerable chasm between the easy and elegant interface design and the arcane workings of ObjectPAL. The non-programmer in Paradox for Windows, unlike the non-programmer who uses Paradox for DOS, will not move by almost imperceptible steps into programming. It will be a major jump.

The result is that while simple Paradox for Windows applications can be designed by any savvy computer user, midlevel and advanced Paradox for Windows applications will probably require a professional. dBASE and its superset/clones have always required significant programming, but Paradox used to hold unique possibilities for the small business where the user had to learn to be the maintainer. I have twice taught the staffs of small offices to operate their own DOS Paradox applications, and to extend them. In choosing this design strategy, Borland may have inadvertently surrendered the mid-range.



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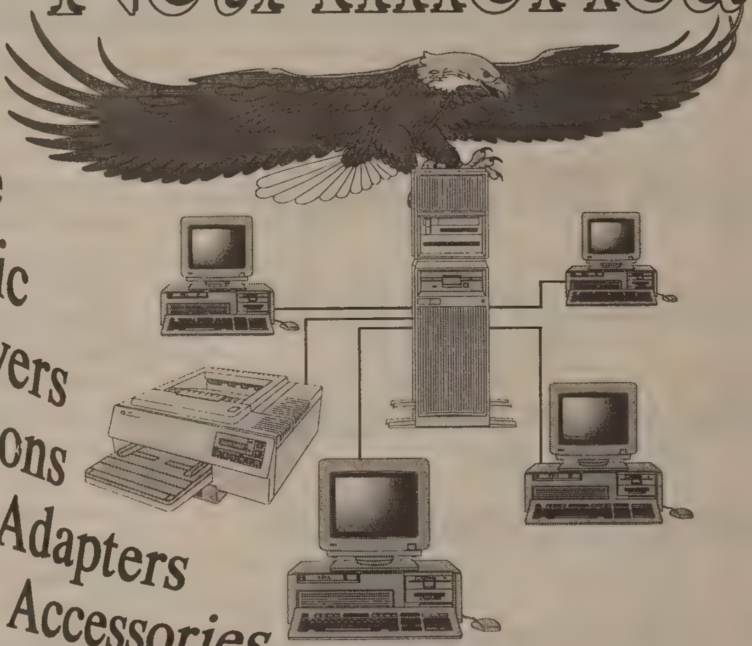

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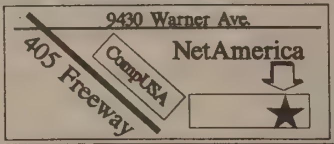

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When I designed my own application for in-house use, I found ObjectPAL to be slow going at the start, but not impossible. An application that I had wanted to develop for several years got built the first week. The screen design was done in an evening. The ObjectPAL code behind some of the workings took all the rest of the time.

Borland documentation is very good, as usual. Every entry has an example, so you can imitate what they have shown in building your own work. The index is very good, which is fortunate—it is in the index that you find an object that will do what you want. There is also an overview, tutorials for the beginner, a guide for developers—six volumes in all.

Paradox for Windows is remarkably well-behaved for an application of this size and complexity. The only exceptions were occasional refusals to share Windows 3.1 with other applications. *InfoWorld* reported an incompatibility with FastBack. I found that Paradox for Windows would not open properly if MicroLogic's InfoSelect for Windows was running—although InfoSelect could be started after Paradox for Windows.

SHOULD I SWITCH?

If you have complex needs that demand visual interfaces, get Paradox for Windows. An on-screen catalogue that must include pictures is a perfect application.

If you need to interact with other Windows applications through Object Linking and Embedding, get Paradox for Windows. An example would be a real-time data monitor for a large scientific or commercial project.

If you need sophisticated graphics that work in real time, get Paradox for Windows.

If you have no patience for either programming or programmers, Paradox for Windows is not for you. DOS Paradox is still a good bet, but Paradox for Windows will require you, or someone you hire, to master ObjectPAL.

If you're thinking about switching the company to Paradox for Windows, detach one of your people to learn ObjectPAL. Send someone to school. Then judge how much added value you get. Your company will be dependent on the services of a programmer, but you will have considerably more power from your software.

I am keeping DOS versions of Paradox around for use with small companies and individual clients, but I have switched all my own operations to Paradox for Windows. The delectable interface design, the many new data-types, and the potentialities of ObjectPAL convinced me. ■

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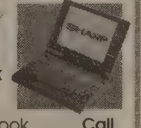

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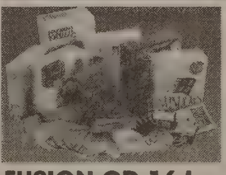

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On Starting A Telecommuting Program

Here Is A List Of Issues To Address And Steps To Take Toward Developing A Successful Telecommuting Program At Your Workplace.

BY ROBERT MOSKOWITZ

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During the last half year or so that these articles on telecommuting have been appearing, readers have begun to let me know they're thinking more and more concretely about getting a telecommuting program started in their own companies. To help, I've put together a checklist of steps to take en route to a successful telecommuting effort.

The basic starting point is to evaluate the need for and potential benefits of allowing people to telecommute to work. In a company where nearly everyone does hands-on work with specialized equipment at the plant, there's likely to be very little need or benefit from telecommuting. But in a company where dozens or more employees do administrative, clerical, contact, planning, or creative work, some people may well be able to accomplish more by working off-site one or more days per week. The company is quite likely to benefit from telecommuting in several ways: increased motivation, loyalty, and productivity; reduced absenteeism and turnover; less need for office space and equipment; and—often the principle motivating factor—easier, cheaper compliance with applicable air quality standards.

By allowing workers to telecommute, a company eliminates the need for other, possibly more expensive, alternative means of cutting back on total number of commuting trips to work, and the consequent environmental pollution its workers generate in getting to work. It also can also tap a larger pool of potential employees living in a wider geographical area.

If the need and potential benefits make telecommuting an attractive option for a company, the second step would be for proponents of telecommuting to get management lined up behind the effort.

If you are the business owner, or manager, you've already accomplished this step. But if you're not, you'll have to lobby for the changes you want to make.

One way is to show management the widespread desire for telecommuting among key employees. Another approach is to document the benefits the company will obtain from installation of a telecommuting program.

> *Telecommuters can be found among certain job types, such as those who work alone at least part of the time, those who don't require a big investment in equipment, and those who need not be in the central office to get their work accomplished.*

An important element in any effort to win management support for telecommuting is to provide background information on the topic: case histories, evaluative reports on other company's programs, statistics on good and bad results from telecommuting experiences, and general descriptive information on how these programs work.

Sometimes, the intangible benefits can be the most persuasive. For example, suppose key employees are disgruntled about commuting, but would be persuaded to stay on if they could begin to telecommute. Just to keep these people happy, management may well institute a program, or at least give it fair consideration.

Assuming you've passed these first two

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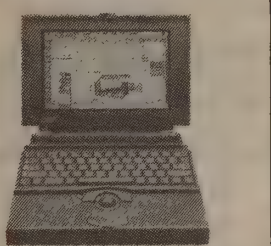

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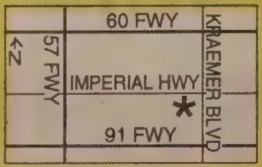

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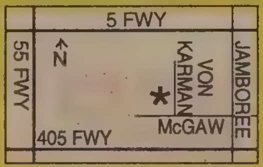

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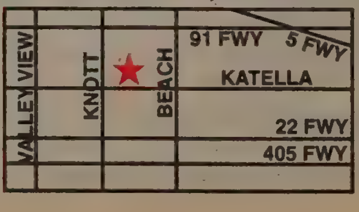

continued from page 72

hurdles, the next step in bringing a telecommuting program to your company is to establish a steering committee, with at least one telecommuting coordinator.

The steering committee should include both management and telecommuter representatives. It should take responsibility for overseeing all the promotional, practical, and policy-making steps toward telecommuting which the company undertakes in the future. The coordinator is the lightning rod and chief promoter of the program. All criticism of telecommuting, and specific problems or complaints, will land on the coordinator's desk. Meanwhile, the coordinator will be ceaselessly promoting within the company the concept and advantages of telecommuting, and will be providing educational materials, organizing workshops and training programs, recruiting potential telecommuters, and otherwise getting people to try the program on for size.

You've already determined—in your "needs and benefits assessment"—that a significant number of employees are candidates for telecommuting. The next step is to identify the specific people who will actually attempt to telecommute. You're probably one of them. You probably know a few others. Find the rest by posting public notices or otherwise alerting employees to this new opportunity.

Telecommuters can be found among certain job types, such as those who work alone at least part of the time, those who don't require a big investment in equipment, and those who need not be in the central office to get their work accomplished. A wide variety of administrative, clerical, sales, managerial, and creative jobs include at least some responsibilities that can be worked via telecommuting.

Telecommuters can also be identified by certain personality types, such as: self-motivated individuals, people who do not need close supervision to meet their performance goals, people who accomplish more by concentrating deeply than by spending time with others, and people who are more self-disciplined than average.

Don't overlook thepower of word-of-mouth. Telecommuting is not always appealing or even understandable in the abstract. But if you see Joe staying home from work one a day a week, you begin to get the point. One motivated tele-commuter can often find half-a-dozen other employees who'd liketo apply for the privilege.

Each person interested in telecommuting should submit an application, detailing the types of work he or she plans to do off-site, estimating equipment and other requirements, and indicating a supervisor who can be contacted for his or her input on the candidate. The coordinator may help the applicant think about and answer some of these questions. To aid in later telecommuting program evaluations, the applicant should provide background information on his or her work and attendance patterns, levels of productivity, and feelings about job satisfaction and loyalty.

Before the program can really take off, however, a company must establish a set of policies on tele-commuting. This is the next hurdle facing the steering committee and project coordinator.

The policy can be brief or extensive, vague or highly specific, usually in accord with what

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the company expects and what policies it has previously enunciated for other operational areas. But whatever wording is used, the policy should cover:

- Who can telecommute, and who cannot;
- What telecommuting is, and what it is not;
- When telecommuting can take place; and
- How telecommuting privileges are to be initiated, and terminated.

Some companies specify exactly how much they are willing to spend to support each telecommuting employee, and exactly which costs the company will cover. Others leave such matters open to case-by-case resolution.

Most company policies assign responsibilities for oversight of the telecommuting program, and detail who will solve problems that may arise. For example, if a telecommuting employee is difficult to reach by telephone, who is responsible for putting in a second line at the employee's off-site workplace?

A number of companies make clear who makes choices about each employee's telecommuting, such as what hours and days are appropriate for this form of work, and what happens if there is a conflict in scheduling.

The best policies tend to set forth the company's attitude about how telecommuting fits into the traditional patterns of work: Is it a privilege or a right? Voluntary or mandatory? Does telecommuting take one out of the loop for promotions and challenging opportunities? Does failure at telecommuting impact one's reputation and overall evaluation? This is important because a small percentage of people

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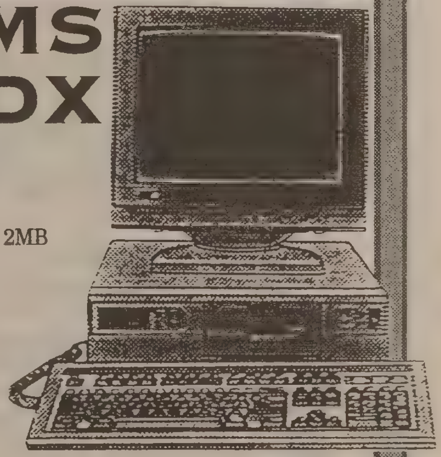

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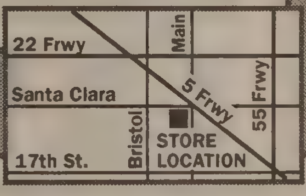

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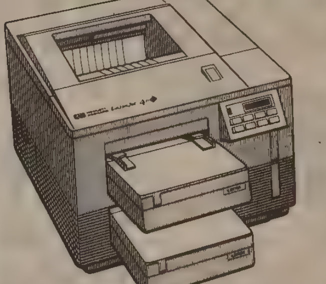

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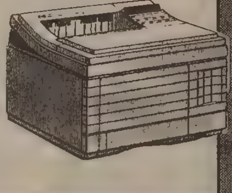

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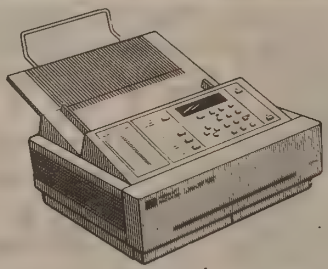

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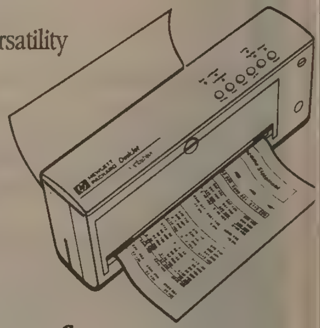

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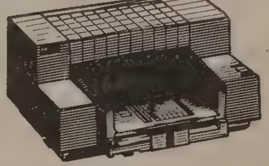

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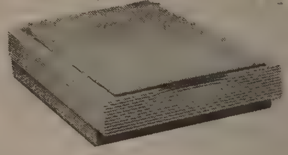

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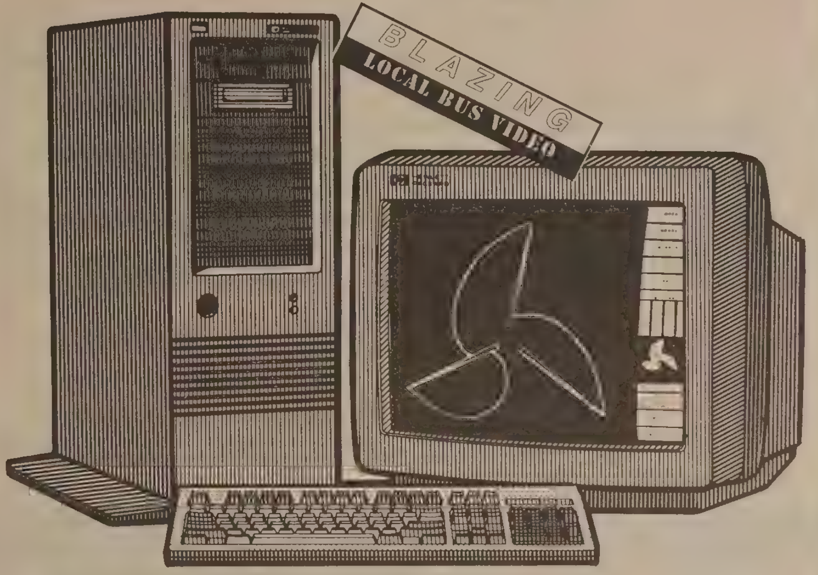

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who try telecommuting find they'd prefer to keep working the more usual way. Company policy should make clear to them, going in, how such a choice will reflect on them in the future.

For some companies, data security is a major issue. Their telecommuting policies must therefore make clear what data may and may not be utilized off-site, what procedures must be followed to take data off-site, and who takes responsibility for implementing these procedures.

With all these procedural matters out of the way, it's time to tackle some of the nuts-and-bolts issues that come along with telecommuting. For example, some people in some jobs will require a computer, network connection, printer, facsimile, modem, and cellular phone in order to accomplish their responsibilities. Others will need just an ordinary telephone and a desk. Each telecommuter will raise some specific issues to be discussed, decisions to be made, and problems to be solved. Here's a brief rundown of some major concerns:

Funding—telecommuting programs generally save companies money. But they many need a "jump start" in the form of funds to get the program rolling. One major nuts-and-bolts issue is to raise all the money you'll need to roll out the first phase of the program.

Candidate approvals—people who want to telecommute have been asking for permission and submitting applications since you began talking up the program. A practical task now is to approve some of these people for training and—if they make it through satisfactorily—for equipment outfitting.

> *If* the need and potential benefits make telecommuting an attractive option for a company, the second step would be for proponents of telecommuting to get man-agement lined up behind the effort.

Telecommuter agreements—each candidate approved for telecommuting should negotiate and sign an agreement with his or her supervisor detailing the terms under which he or she will telecommute. The agreement should make clear all the rights, responsibilities, and privileges that telecommuting entails.

Equipment outfitting—equipment is not always a big concern in telecommuting. Some people need only a telephone and a pencil to telecommute successfully. But some applicants will need more, and this is the time to begin locating the equipment they need, getting authorizations to purchase or rent any new items required, and setting things up properly for each of them.

continued on page 89

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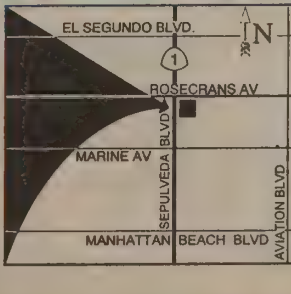

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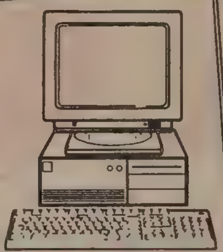

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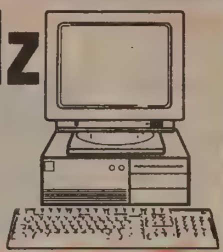

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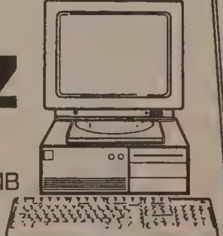

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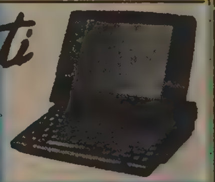

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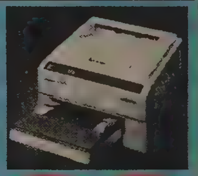

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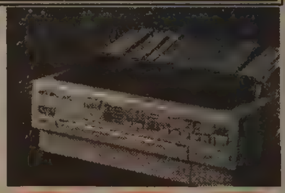

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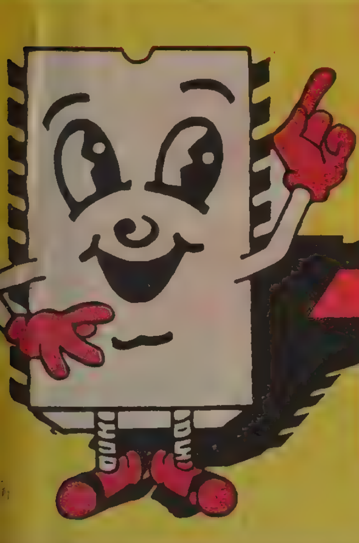

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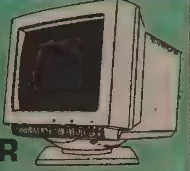

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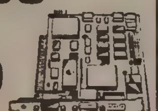

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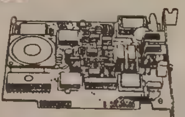

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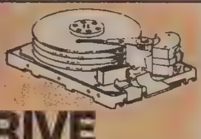

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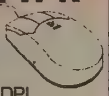

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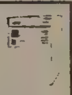

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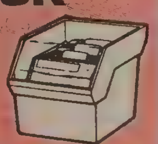

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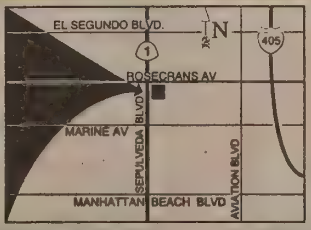

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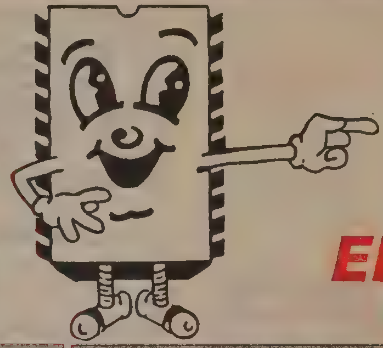

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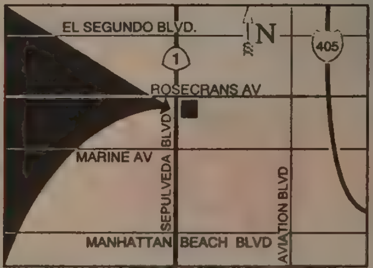

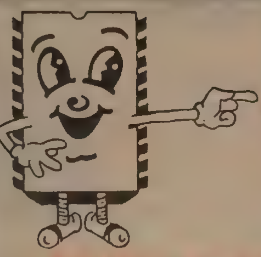

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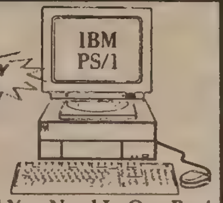

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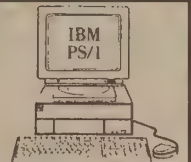

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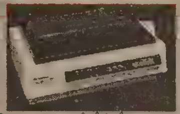

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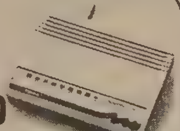

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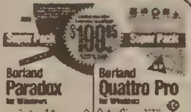

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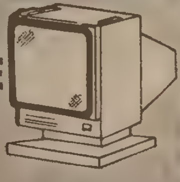

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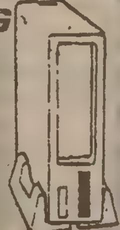

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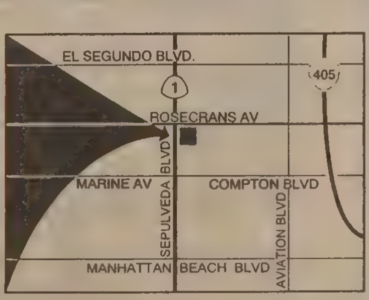

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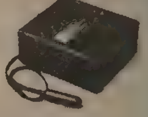

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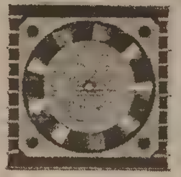

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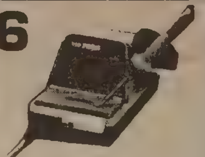

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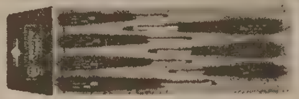

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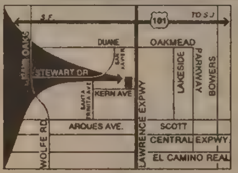

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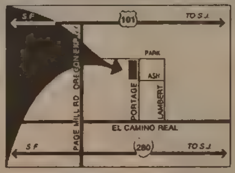

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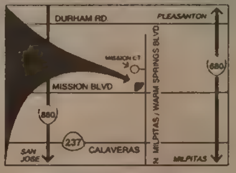

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continued from page 82

Locations—many people can telecommute from their own homes. But some cannot, or don't want to, and need another place to work. As we've detailed in previous columns, there are commercially available telecommuting centers. Telecommuters can also use rented space in an appropriately staffed "executive center" office, or even use office space "swapped" with another company or division, allowing telecommuters to work from a relatively nearby facility that's mainly a central office for other workers.

With a cadre of eager telecommuters ready to start the program in your company, it's time to begin motivating and training them for their new method of working. Most of us have spent a lifetime building the habits of going to work (or school) and then coming home. Telecommuters, many of whom will work at home, must unlearn these habits and learn how to separate work-oriented activities from home- and family-oriented activities—all happening in the same place.

Training should cover a variety of topics, including how to establish performance goals, how to set up a good and productive environment at home or wherever the telecommuter will work, how to relate to and communicate with others while telecommuting, and so forth.

Another aspect of training should be mastery of any technical matters. For example, some telecommuters will use a computer at home. But this is different from using one at work, where the network is always available and logging on in the morning is simple and automatic. Training should familiarize these telecommuters with the finer points of

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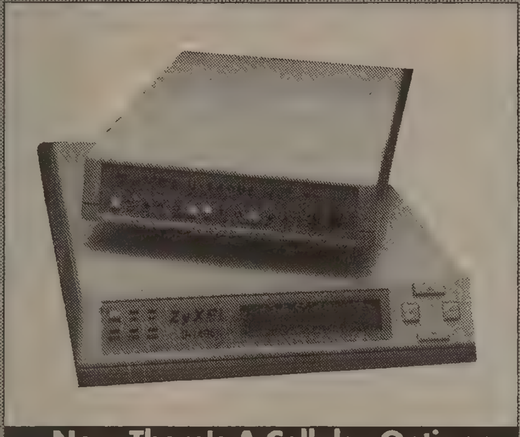

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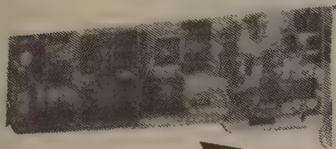

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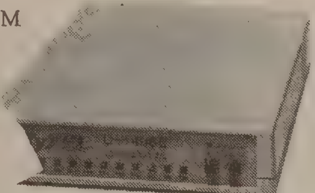

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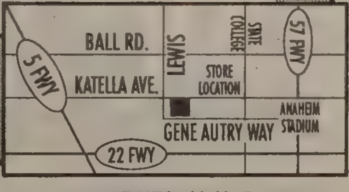

using a computer and a modem to dial into the network and log on from outside the office.

Each telecommuter has a supervisor, who may or may not be a telecommuter, as well. These supervisors require their own training in such topics as: how to supervise a person working in another location, how to manage by "objectives" rather than by "visual monitoring," and how to coordinate the activities of a work-group when some employees may not be present every working day.

Telecommuters may be overwhelmed by the sudden freedom and flexibility they're given in fulfilling their responsibilities, and productivity can waiver dramatically during an initial period of acclimation. Supervisors can feel threatened by the sudden disappearance of part of their work force, and can have difficulty accepting that some employees can work effectively over long periods of time without physical observation and oversight by their supervisor. The training should anticipate these emotional difficulties, and get people adjusted to the unfamiliar aspects of telecommuting as quickly as possible.

At a certain point, there's nothing left to do but get started. The steering committee and coordinator should agree on a start date. The first candidates will complete their training, establish their work locations, and begin telecommuting.

continued on page 158

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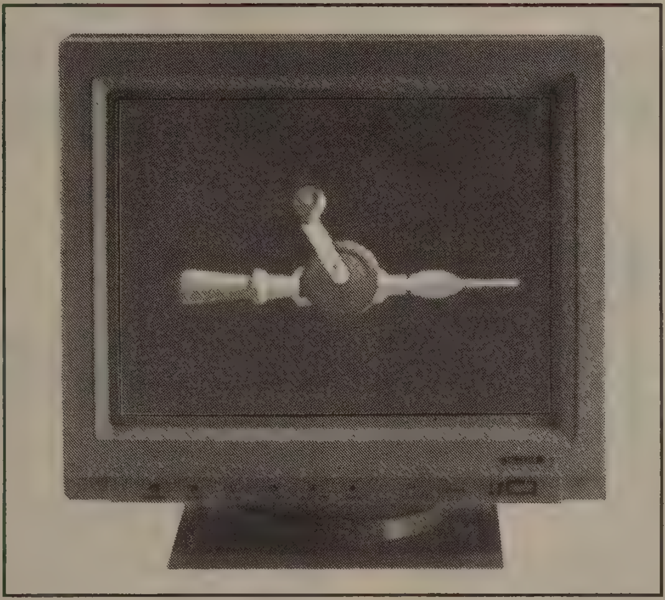

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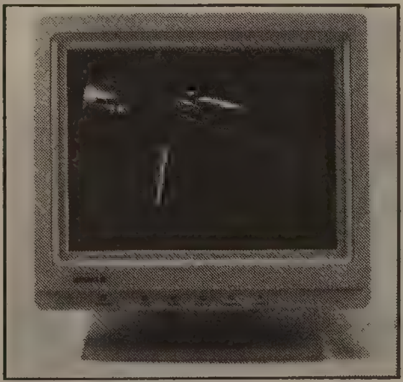

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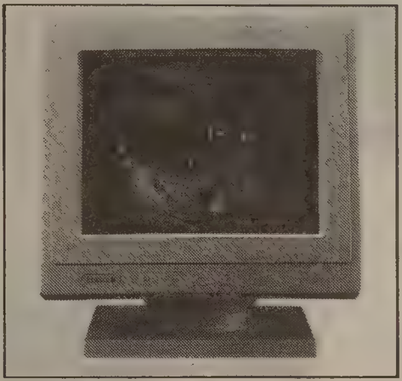

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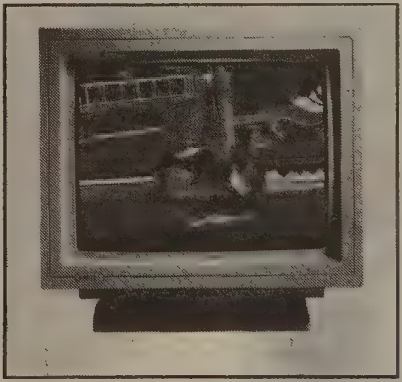

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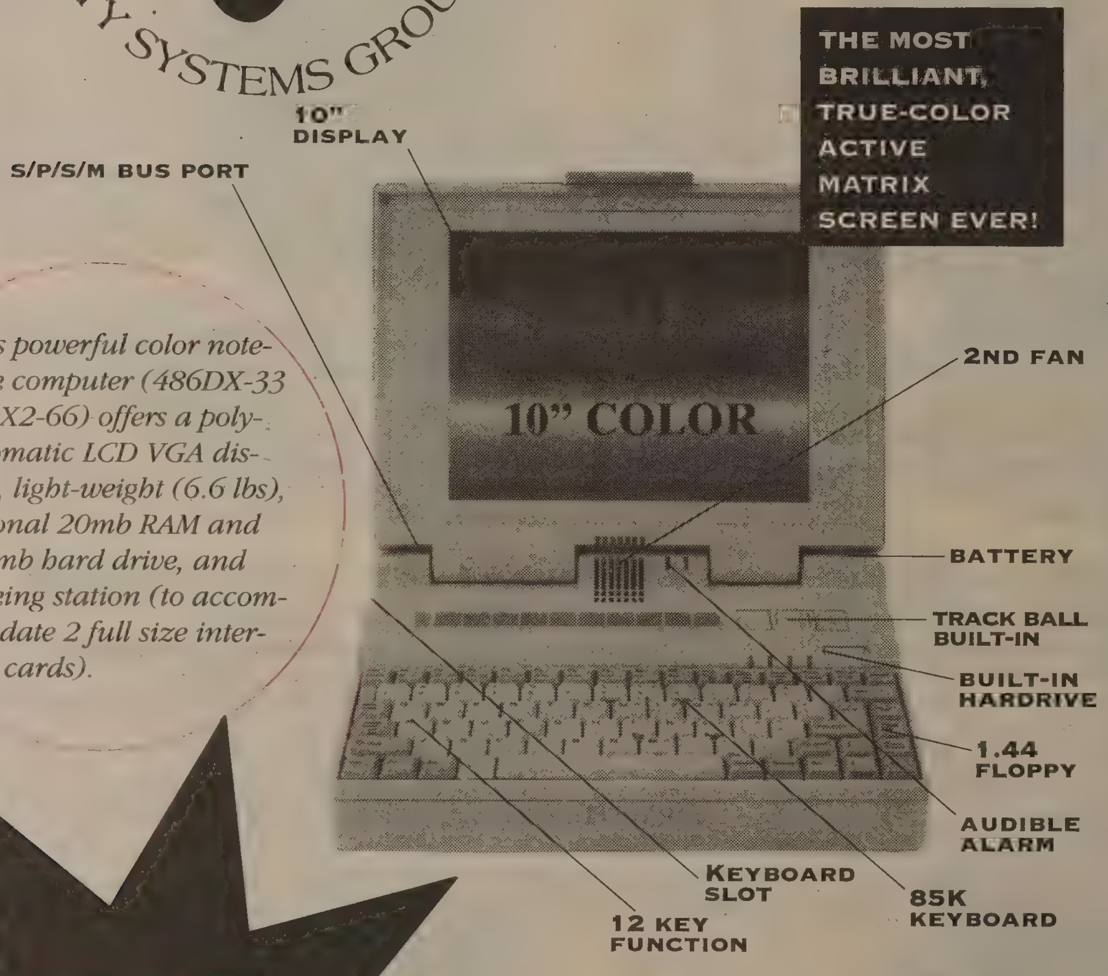
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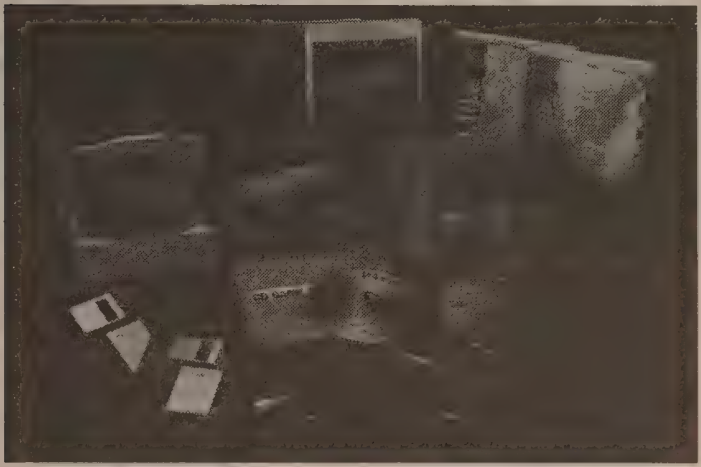

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PART TWO

plus

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TOTAL YOUR SYSTEM

By Adding Parts 1-3
And Any Other Add's On This Page

PART ONE__________
PART TWO__________
PART THREE__________
OTHER__________
OTHER__________
OTHER__________
OTHER__________
TOTAL:__________

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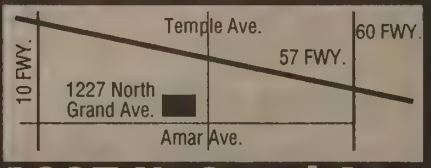

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Faxmodem Power For Windows Users

Eclipse 1.21 Adds OCR And Other Enhancements

BY WOODY LISWOOD

RESOURCES:

Eclipse Fax 1.21, $149
Eclipse Systems, Inc.
33 W. Monroe St.,
Suite 1121
Chicago, IL 60603
(312)541-0260

If you use a faxmodem, run Windows, and are frowning about the declawed fax software which accompanied your faxmodem, Eclipse Fax will get that smile back on your face.

On the surface, Eclipse is like other products—it sends and receives faxes. With version 1.21, Eclipse also added OCR.

Below the surface is a great complexity. Eclipse lets you modify those faxes you send or receive. You can place lines, graphics, boxes, and arrows—even type text directly on a fax. Eclipse also lets you fax to a file, keep a store of boilerplate faxes, and then assemble them for transmission with just a few mouse clicks.

If you receive volumes of faxes, all of which you feel you have to keep forever on that extra-large hard disk, Eclipse compiles and indexes them for storage and easy retrieval.

Eclipse works with send-only faxmodems, send and receive faxmodems, and CAS specific faxmodems.

WORKING WITH ECLIPSE

Installation is Windows standard. Run SETUP from the FILE MENU.

Adjusting Eclipse to your needs is a snap, with everything done on a single screen. Here is where you will first notice the sophistication which puts Eclipse ahead of the competition. Instead of a single Name and Station identifier, for example, you can enter as many as you wish. This means that you can easily configure your fax to additional configurations by just entering Setup and selecting new names, IDs, paper sizes, and the like from a Windows standard scroll-down menu.

I use my faxmodem for *MicroTimes* correspondence, my Human Resource Consulting practice, and to fax messages as Director of Human Resources for Monarch Ski Resort. With just a couple of clicks, I can change my company and station ID as appropriate. (You do, however, have to go back to the main setup screen to change your sending ID. It would be much easier if Eclipse had the Send ID as part of the same selection procedure it uses for selection from your phone book.)

Like all the other fax products, Eclipse installs as a printer for sending faxes from Windows. If you want to receive faxes, however, you must run the Eclipse fax manager program. To do this, you must add a LOAD=EFAXMGR.EXE to your WIN.INI file or run it from an ICON whenever you want it active.

When you select Eclipse to send a fax, a large dialog box opens, from which you can select the name and company you want to send to, or create a new phone book entry. Additionally, if you have prepared graphic letterheads or second sheets, you can have Eclipse add these graphics to your fax as it is being prepared for sending. Also, at this stage, you can fax to a file, preview the file as it will look as a fax—even mark up the fax with those arrows and boxes, place additional images around the fax, and append additional pages or faxes to the one you are planning to send.

One feature I particularly like is the small optional information window which appears at the bottom of the screen during transmission. It keeps you informed during the process of sending the fax. Without that dialog box, it's hard to troubleshoot problems such as faulty phone lines. A Send Log also keeps track of each fax sent and allows you to view or print it, as well as send it to others or reschedule a transmission if it did not go through originally. Since sent faxes take up disk space, you will need to remember to visit your Send Log and delete your successful sends.

Receiving faxes is automatic. Start up Eclipse and click a few dialog buttons. I set Eclipse to notify me when it receives a fax, and to receive automatically. I turned off print on reception. Going into the Receive Log lets you view, print, or delete your received faxes.

One advantage of computer-controlled faxes is the ability to group faxes and send them late at night when phone rates are cheaper, and to send the same fax to a designated group. Eclipse does both with just a few clicks.

A feature I found interesting is Eclipse's ability to take all of your received faxes and merge them into a single document. Then you can actually assemble single pages from these documents to create a new fax. I found this handy in collecting drafts of some employment contracts I was writing. I added each received contract, with legal changes and new negotiation suggestions, to a single master document. This way, I always have a history of everything associated with a single document.

Eclipse also comes with a DOS TSR, so that it can receive faxes even if you are working in DOS. This is great. What's even better is that you don't have to load the DOS TSR at all if you're working under Windows, as you must with many other products.

Printing faxes is frequently a nuisance, but Eclipse gives you a wide range of handling options. Not only can you view the received faxes, as you can with all other fax programs, you can also have Eclipse take a multipage fax and create a "thumbnail" set of images on your screen for easy previewing, and print the thumbnail if you wish. Eclipse also lets you print only a single paragraph or portion of a fax page, if that's all you need.

SCANNING AND OCR

Eclipse also supports a few scanners, so you can scan in a piece of paper as if you had a normal fax machine. At this point, you can scan to a fax file, or scan directly to the printer. Once you've scanned to a file, then processed it with the OCR, you can add text to the resulting file with a minimum of effort.

The OCR functions are simple to use. After you receive a fax, or scan a document into a file, select OCR from the menu system and let Eclipse work on the file. When it is done, it becomes a notepad file which you can then import into your favorite word processor. I tried the OCR functions on a variety of faxes, some of which contained major graphic elements. The OCR sometimes got confused by the graphics and put some odd characters into the notepad file, but it always seemed to recognize the text elements and convert them properly.

RECOMMENDATIONS, POSSIBLE PROBLEMS

I could find no problems with this software—it's designed the way I think a fax product should be, and has the features and complexity I need in my business. Eclipse has bumped all other fax products from my disk.

The documentation mentions that because of the way 1-2-3 for Windows manages memory, you will have problems faxing to a file when in 1-2-3W. Nonetheless, in three different attempts to fax from 1-2-3W I had no problems. ■

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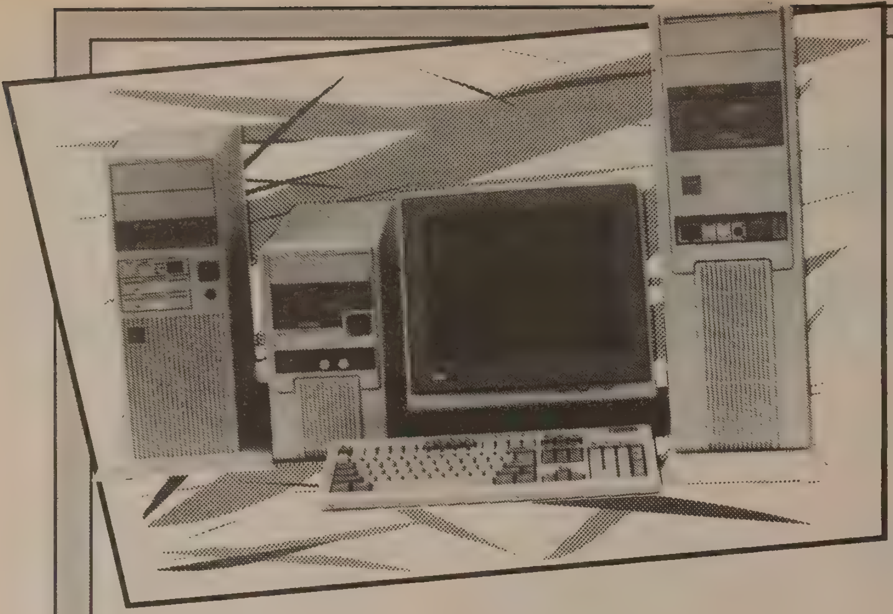

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May 16–20 ICA COMNET: The Conference & Expo For The Enterprise Network. Dallas. World Expo Corp. Call: 1-800-225-4698.

May 19–21 Meckler's 4th Annual Virtual Reality '93 Conference & Exhibition. San Jose. Mekler Conference Management. Call: 1-800-635-5537.

May 22–23 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

May 23 Computer Show & Sale. Scottish Rite Center, San Diego. MarketPro Shows. Call: (415)388-8893.

May 24–28 ESRI's Annual User Conference. Palm Springs. Environmental Systems Research, Inc. Call: (909)793-2853.

May 25–27 NeXTWORLD Expo And Conference '93. San Francisco. DCI. Call: 1-800-767-2336.

May 29 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

May 30 Computer Show & Sale. Antelope Valley Fairgounds. MarketPro Shows. Call: (415)388-8893.

JUNE

June 5 Computer Show. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

June 5–7 10th Annual ShowBiz Expo. Los Angeles. Live Time, Inc. Call: (213)668-1811.

June 6 Computer Show. Sequoia Conference Center, Buena Park. Computer Marketplace. Call: 1-800-800-5600.

June 6 Computer Show & Sale. Glendale. Richard James Corp. Call: 1-800-685-1400.

June 6–9 BG 96 Dreams Vs. Reality—The 1993 Burton Group Conference On Network Computing. Pebble Beach. The Burton Group. Call: 1-800-TBG-9924.

June 11–12 MacFair LA '93. Burbank Convention Center. LAMG. Call: (310)574-8047.

June 12 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

June 12–13 ACAD CorelDraw Conference. Glendale. ACAD. Call: (818)955-5867.

June 12–13 CorelDraw User Conference. Burbank. Association of Corel Artists & Designers. Call: (818)563-ACAD.

June 14–15 Outsourcing Conference. San Francisco. DCI. Call: (508)470-3880.

June 14–17 Electronic Messaging '93 Conference. Atlanta. EMA. Call: (703)875-8620.

June 14–17 Object World Expo. San Francisco. IDG World Expo Corp. Call: 1-800-225-4698.

June 19 Computer Show & Sale. Anaheim Stadium, indoors. Richard James Corp. Call: 1-800-685-1400.

June 21–22 Technology Policy In The '90s: Critical Strategic Concerns For The Telecommunications & Biotechnology/Medical Products Industries. Cambridge, MA. MITEnterprise Forum. Call: (617)862-0397.

June 23–26 Seybold Digital World Conference. Beverly Hills. Seybold Seminars. Call: (310)457-8551.

June 26–27 Computer Show. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

JULY

July 3 Computer Show & Sale. Glendale. Richard James Corp. Call: 1-800-685-1400.

July 10-11 Computer Show & Sale. CSUN, North Campus. Richard James Corp. Call: 1-800-685-1400.

July 17 Computer Show. LA Fairgrounds, Pomona. Computer Marketplace. Call: 1-800-800-5600.

July 18 Computer Show. Sherman Entertainment Center, Reseda. Computer Marketplace. Call: 1-800-800-5600.

CLASSES, SEMINARS, AND WORKSHOPS

MAY

May 12–14 Intro To QuarkXPress Workshop. Los Angeles. UCLA Extension. Call: (310)206-1422.

MAY 22–23

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JUNE 5

COMPUTER SHOW

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Computer Marketplace computer shows feature over three hundred exhibits with thousands of products. They are now featuring seminars open to all users—from the beginner to the advanced computer user. Admission is $7.00 and shows are from 10:00 am to 5:00 pm. Los Angeles County Fairgrounds (Fairplex), Pomona. Call: 1-800-800-5600.

JUNE 11–12

MACFAIR LA '93

Burbank Convention Center

The Los Angeles Macintosh Group expands this year's MacFair LA '93 to two days of exhibits and seminars, dedicated to Macintosh users. Events on the opening day will be focused toward answering the questions of business decision-makers. On Saturday, called "community day" at the Fair, a more diverse crowd will be able to explore different solutions to their Macintosh computing needs. Contact: Los Angeles Macintosh Group, (310)278-LAMG or (818)574-8047.

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June 6
Sunday
BUENA PARK - Sequoia Conference Center
Take the Beach Blvd. Exit off the 91 Freeway, go one block North to 7530 Orangethorpe.

June 26 & 27
Saturday & Sunday
POMONA - L.A. County Fairgrounds (Fairplex)

July 17
Saturday
POMONA - L.A. County Fairgrounds (Fairplex)

July 18
Sunday
RESEDA - Sherman Entertainment Center
From 101 Freeway, take Reseda off ramp, turn left (if traveling East) on Reseda Blvd. to Sherman Way, turn right, one block to Canby Street. 18430 Sherman Way.

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- Macintosh Based Applications
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- Networking for Large Corporations
- Money Saving Computer Usage in Business
- Computer Security Devices
- The Cottage Bus. & Your Future

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What's Happening?

Check the MicroTimes Calendar of Events in this issue for computer-related classes, seminars, and shows in your area.

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Calendar Of Events continued

May 17 Power Shmoozing With The Pros. The Art Of Networking In Los Angeles. Van Nuys. The Mulholland Group. Call: (818)787-5100.

May 18 Excel Phase One Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 18–June 22 Adobe Photoshop Workshop. Los Angeles. UCLA Extension. Call: (310)206-1422.

May 19 Lotus 1-2-3 Phase One Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 20–June 24 Aldus Freehand Workshop. Los Angeles. UCLA Extension. Call: (310)206-1422.

May 20 WordPerfect Phase Two Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 21 New LIFE ART One Day Class. Studio City. Advanced Learning Center. Call: (818)753-9799.

May 21 Paradox Phase One Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 21 Word For Windows Phase One Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 22 How To Start & Build A Full-Time Or Part-Time Profitable Computer Consulting Practice Seminar. Irvine. William Mooney Associates. Call: (213)321-9342.

May 24 Windows Class. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 25 Quattro Pro For Windows Class. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 26 WordPerfect—Tables, Macros & Merges Class. Burbank. Unique Learning Centers. Call: (818)843-8119.

May 27 Desktop Publishing Design Seminar. San Diego. Mavis & Moore. Call: (313)761-5210.

May 27 Lotus 1-2-3 For Windows Phase One Course. Burbank. Unique Learning Centers. Call: (818)843-8119.

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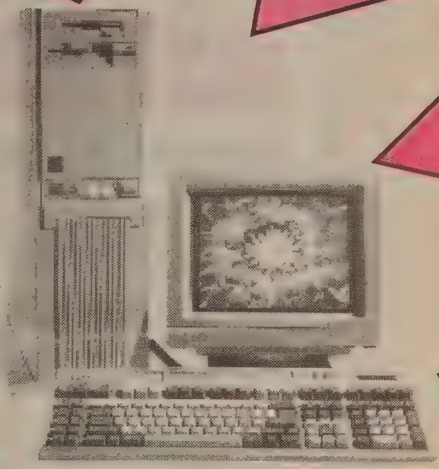

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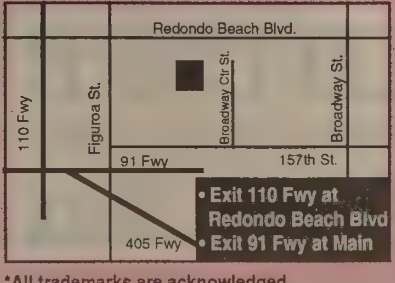

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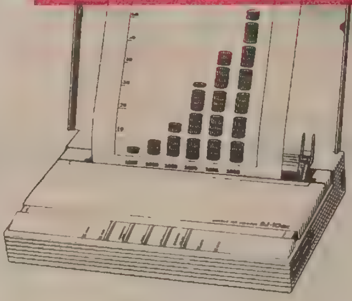

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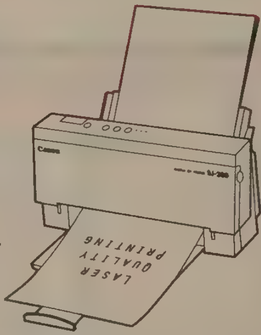

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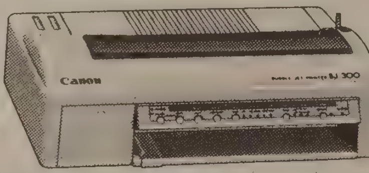

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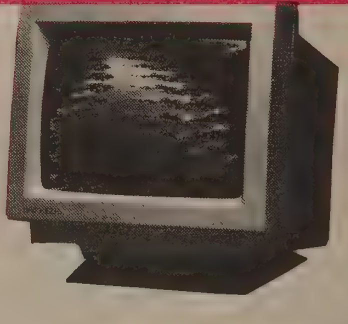

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BBS SPOTLIGHT

By John Wolcott

Approaching Infinity

Just logging on to a subscription BBS can be an event in itself. Many subscription BBS services offer social interaction along with a number of entertaining and useful features. Users find a new level of computer use beyond any software package that can be purchased. They find themselves looking forward to their daily dose of BBS. I can't blame them.

This month's BBS Spotlight features a BBS with a high level of this social interaction, Infinity BBS, with a large number of Southern California users who truly appreciate the full list of options.

Infinity BBS has now been in operation for one year. It was started by the three system operators Eric Uglum, Dan Minear, and Eric Robitaille as a business venture to combine computing with communication. All three Sysops hold Advanced Class Amateur Radio licenses that allow them to carry the art of communication even a step further.

The BBS has sixteen incoming lines available to callers. The majority of the lines support 2400 baud communication; two lines offer higher speeds, 9600 baud and 14,400 baud, to ease file transfer tasks. The 2400 baud speed is more than adequate for the typical user.

Infinity BBS has all of the usual BBS amenities including shareware and public domain file transfer, email supporting Fidonet, Special Interest Group forums, teleconferencing (group chat), online games, classified advertising, and an unusual BBS feature—current weather information with forecasts and even weather facsimile pictures from satellite.

The shareware and public domain files available for download include an armload of DOS and Windows applications, as well as Commodore Amiga applications and graphics. There are even a few Apple Macintosh files. In all, there are over 3GB of files for your downloading pleasure. You'll find all of the common transfer protocols supported, including ZMODEM. There are no download/upload ratio requirements.

The electronic mail section allows you to read current mail sent to you, or messages that you've posted for other users. With Fidonet support, email can be sent across the country or all over the world, with the mail being automatically forwarded nightly. This allows conferences on varying topics among computer users worldwide.

Special Interest Group forums (SIGs) cover a wide range of topics for almost anything that would interest you. If there's a topic you want to discuss that's not available, you may start your own SIG forum.

Teleconferencing is where all the fun really is. Chatting through your keyboard with other users in a real-time communication link offers spontaneity and creativity among a number of "computer junkies" for almost any topic of discussion. This "group chat" mode has its own world of commands that can be learned with online help, but learning all of these commands is not prerequisite to chatting. You can jump on in and type away with any comments you may have displayed to all of the users in the teleconference. You'll pick up the special commands as you go. Occasionally, you'll see a comment displayed such as, "Maniac is rolling around on the floor, laughing!" This is the result of the user, Maniac, typing in one of these special teleconference commands. I

Continued on page 110

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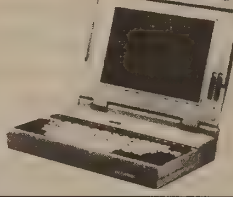

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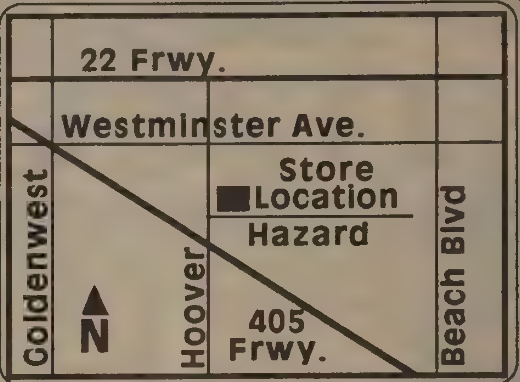

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BBS Spotlight cont.

Continued from page 105

found the users of the teleconference to be very friendly and just having good computer fun. The atmosphere is very relaxed and a real BBSing pleasure.

If you ever wanted to be a Gnome Assassin in a world of attacking monsters, such as the dreaded Frostbat, here's your chance! The online games are a world of their own. They allow role playing in fantasy lands along with other system users. The commands for using the games can be a bit confusing to the inexperienced, but help is available for command usage from within the games themselves. Don't be afraid of getting into an online game and experimenting. The worst that can happen is that the attacking monsters kill you and you have to start all over again.

Current weather information is always available from an automated weather system—temperature, dew point, relative humidity, barometric pressure with the trend, wind direction and speed with calculated wind chill factor, and a forecast for the coming week. There's more weather information here than on the eleven o'clock news!

The user group has regularly scheduled special events where you can actually meet and mingle with your teleconferencing buddies. A weekly "pizza fest" at Bullwinkle's Pizza Parlor in Fountain Valley features "Meet your Sysop." The users at the weekly pizza hang-out are pleased with their system membership—it's really a hobby within a hobby for most of the 400+ registered members. Sysop Eric Uglum comments, "A BBS should combine the best of communication hobbies with just having a good time. At Infinity, we do just that."

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Infinity BBS proves to be a great BBS value with some unique features that are bound to please. Drop on in and snoop around a bit. You'll be glad you did.■

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BBSES continued...

James Kalinowski. [Exp. #109.]

Merchants Of Wonder BBS. (818)759-0060, 759-0097, 7095638. 24 hrs. Online games, multiuser chat, matchmaker, forums, 5000+ files. Free trial. Sysop: Teresa Brandt and John Lipski. [Exp. #109.]

Microlink PCUG BBS. (818)961-7903. 24 hrs. Free. [Exp. #111.]

MUSO-BBS. (818)884-6799. 9600. Musician and music industry oriented BBS. Discussion forums, files, talent database. Sysop: Myles Wakeham. [Exp. #108.]

Panasia BBS, Glendale. (818)569-3740. 1200–14,400. Glendale, QWK/REP, Intelac RegHub, no fees. [Exp. #109.]

Parthenon BBS. (818)727-7070. 24 hrs., 300/1200/2400/9600/14,400. Utils, Windows, Toshiba stuff, Usenet feeds. Sysop: Steven Foster. [Exp. #109.]

PC Solutions BBS. (818)776-2397. 9600. Fidonet, all the latest warez, games, utils. Free. [Exp. #110.]

The Rouge's Guile. (818)347-4291. 14,400. Online games, tons of new files, Fidonet, Fishnet, member World Wide File Distribution Network. [Exp. #110.]

Sahara Club. (818)893-1899. 8-N-1, 16,800. Off-road, timber, guns, and more. Fidonet, free. Sysop: Patrick Martin. [Exp. #108.]

Software Bank. (818)993-5516. 24–14.4K. 13,000 DL files, Chat, StarTrek, DS9, OS/2, Windows, +30 other Fidonet echos. Multiline games. New user friendly! [Exp. #111.]

Software Bank. (818)993-5516. 2400/9600/14,400. OS/2, Windows, Star Trek Fidonet echos, games, and chat. 13,000+ files D/L. [Exp. #110.]

Text City RBBS. (818)566-6648. 2400. ASCII text files of all kinds: computer how-to, tutorials, fiction, historic text files, and more. Free. Sysop: Tim Chambers. [Exp. #109.]

Tin Shack BBS. (818)992-3321. Over 1.5GB of files. Local numbers available. Free. Sysop: Guy Nohrenberg. [Exp. #110.]

The Treehouse BBS. (818)988-2115. Large file library featuring 4GB of adult GIFs, games, Windows programs, etc. Private and group chat. Free full access. [Exp. #111.]

Tri-City Apple BBS. (818)288-6540. 8-N-1, 24 hrs., 2400. Mostly Apple II, email, PD, UL/DL. [Exp. #108.]

Utilities Plus BBS. (818) 842-3631. 2400-14.Kv.32. Utilities, IBM files, Adult GIFs. Member of United Sysops Association.

VICUG BBS (Valley IBM/Compatibles User Group BBS). (818)879-8428. 8-N-1, 24 hrs., 300/1200/2400. Speakers, demos, newsletter, disk bank. Voice info: Frank Yao, (818)706-0564. [Exp. #110.]

Wizardry BBS. (818)222-4444. 1200–14,000 baud. Online games–D/Loads, U/Loads, GIFS, text files. Free![Exp. #111.]

909

The Digital Publishing BBS. (909)861-0250. 300/1200/2400/9600/14,400. Online publishing, programs, files. 386BSD, OS/2, Windows, DOS. [Exp. #108.]

The Tavern. (909)591-9149. 300/1200/2400/9600/14,400. Adult/clean, GIFs, NetWare, games. Free and subscription. Sysop: The Bartender. [Exp. #111.]

916

Greystone BBS. (916)758-1257. 24 hrs., 1200/2400/9600/14,400. 1.4GB, UNIX, USENET feed, msg base. No fees, no charge. [Exp. #110.]

Video ViSion BBS. (916)682-1655. 24 hrs., 300/1200/2400/9600. Games, graphics, Windows & source code. 360MB. Sysop: Roel Sarceno. [Exp. #108.]

Continued on page 115

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Multi & Media beyond

Dear Reader,

Welcome to *MicroTimes*'s new section, MultiMedia & beyond. We need your help! In order to meet the increasing needs of our readers for the highest quality editorial and information possible, we are asking you to participate in our reader survey.

Please take the time to answer the questions below and fax back your response to (213) 851-8303. As an added bonus for your participation, we will place your name in a drawing for a FREE first-class subscription to *MicroTimes* upon receipt of your completed questionaire.

---

1. What is your organization's primary business activity at your location?

☐ Aerospace
☐ Government
☐ Education
☐ Architecture, Engineering
☐ Communications: Advertising, Graphic Arts, Marketing, Public Relations, etc.
☐ Media: Broadcast, Film, Television, Publishing, etc.
☐ Manufacturing (computer, multimedia related): Computer/audio/video/audiovisual hardware, software, peripherals, etc.
☐ Manufacturing (other) ________
☐ Dealer, retailer, distributor (other) ________
☐ Accounting, Banking, Finance, Insurance, Real Estate
☐ Health, Medical, Legal
☐ Agriculture, Mining, Construction, Oil, Transportation, Utilities
☐ Research and Development
☐ Computer/multimedia contracting, consulting
☐ Consulting (other) ________
☐ Other businesses and services ________
☐ Other (please specify) ________

2. Title: (Select one only.)

☐ Chairman/President/ Owner/Partner
☐ Vice President/General Manager
☐ Director/Department Manager
☐ Project Manager/Group Leader
☐ Creative Director/Designer/Producer
☐ Micro Manager/Coordinator/Specialist
☐ Network/Datacomm./Telecom Manager
☐ Manager/Supervisor (not listed above)
☐ Programmer/Analyst
☐ Architect/Engineer
☐ Specialist/Technician
☐ Scientist
☐ Educator
☐ Professional
☐ Consultant
☐ Representative
☐ Other (please specify) ________

3. Department/Function: (Select one only.)

☐ Engineering/Technical
☐ MIS/DP
☐ Manufacturing/Operations/Production
☐ Administration/Management/Human Resources
☐ Accounting/Finance
☐ Advertising/Communications/Public Relations/Promotions
☐ Sales/Marketing
☐ Industrial design
☐ Corporate training
☐ Education
☐ Science/Research & Development
☐ Consulting
☐ Other (please specify) ________

4. Which of the following operating systems are in use at this entire location? (Select all that apply.)

HW Operating Systems:

☐ DOS
☐ Windows
☐ OS/2
☐ Macintosh
☐ UNIX
☐ Other (please specify) ________

LAN Operating Systems:

☐ Novell Netware
☐ Appleshare
☐ LAN Manager
☐ NFS
☐ Banyan VINES
☐ Other (please specify) ________

5. Which of the following types of computers are used by you or members of your department or work group, or household. (Select all that apply.)

	Company	Household
IBM/Compatible 286 PC	☐	☐
IBM/Compatible 386 PC	☐	☐
IBM/Compatible 486 PC	☐	☐
IBM/Compatible Laptop/Portable	☐	☐
Other IBM Compatibles	☐	☐
68040 Macintosh	☐	☐
68030 Macintosh IIfx, IIci, IIcx, IIx, IIsi	☐	☐
68020 Macintosh II/LC	☐	☐
Macintosh Portable PowerBook	☐	☐
68030 Macintosh SE/30	☐	☐
Other Macintosh	☐	☐
Amiga	☐	☐
Workstation (HP, Sun, DEC, Silicon Graphics, NeXT, etc.)	☐	☐
Other Platform (please specify) ________	☐	☐

7. In which ways are you personally involved in your organization's decision to purchase these products? (Select all that apply.)

A. Multimedia-related hardware and peripherals

☐ Determine needs/features
☐ Evaluate brands
☐ Specify/recommend brands
☐ Specify/recommend vendors/suppliers
☐ Authorize the purchase
☐ Other (please specify) ________

B. Multimedia-related software

☐ Determine needs/features
☐ Evaluate brands
☐ Specify/recommend brands
☐ Specify/recommend vendors/suppliers
☐ Authorize the purchase
☐ Other (please specify) ________

6. Please indicate which of the following products you plan to purchase for household or company use? (Select all that apply.)

Multimedia-related Hardware /Peripherals	Company	Household
IBM/Compatible PCs	☐	☐
Macintoshes	☐	☐
Amigas	☐	☐
Workstations	☐	☐
Color monitors	☐	☐
Presentation monitors	☐	☐
Multimedia upgrade kits	☐	☐
Audio boards	☐	☐
Graphics boards	☐	☐
Digital/Analog video boards	☐	☐
MIDI sequencers/synthesizers	☐	☐
LCD display panels	☐	☐
Desktop scanners	☐	☐
Mice/joysticks/input tablets	☐	☐
Color printers	☐	☐
CD-ROM drives	☐	☐
Laser disc players	☐	☐
VCRs and VCR controllers	☐	☐
Video cameras	☐	☐
Laser printers	☐	☐
Color proofers	☐	☐
High-resolution scanners	☐	☐
Color scanners	☐	☐
Storage devices	☐	☐
Networking systems	☐	☐
Supplies/accessories	☐	☐
Color Copiers	☐	☐
Other (please specify) ________	☐	☐

Multimedia-Related Software	Company	Household
Authoring	☐	☐
Music composition/editing	☐	☐
Sound editing	☐	☐
2-D/3-D rendering/modeling	☐	☐
Animation	☐	☐
Desktop publishing	☐	☐
Draw/paint/image editing	☐	☐
Fonts	☐	☐
Presentation graphics	☐	☐
Clip art	☐	☐
Clip music	☐	☐
ip video/animation	☐	☐
Education application/titles	☐	☐
Electronic reference	☐	☐
Other (please specify) ________	☐	☐

8. During the next 12 months, will you specify, recommend, buy, or approve the purchase of multimedia-related hardware, peripherals, software, or services worth: (Select one only.)

☐ $1,000,000 or more ☐ $500,000 to $999,999
☐ $250,000 to $499,999 ☐ $100,000 to $249,999
☐ $50,000 to $99,999 ☐ $25,000 to $49,999
☐ $10,000 to $24,999 ☐ $5,000 to $9,999
☐ Less than $5,000 ☐ None of these

9. In the last 12 months, did you specify, recommend, buy, or approve the purchase of multimedia-related hardware, peripherals, software, or services worth: (Select one only.)

☐ $1,000,000 or more ☐ $500,000 to $999,999
☐ $250,000 to $499,999 ☐ $100,000 to $249,999
☐ $50,000 to $99,999 ☐ $25,000 to $49,999
☐ $10,000 to $24,999 ☐ $5,000 to $9,999
☐ Less than $5,000 ☐ None of these

10. How many people are employed in your entire organization, including all its branches, subsidiaries, and locations? (Select one only.)

☐ 1000 or more ☐ 500-999 ☐ 100-499
☐ 25-99 ☐ Less than 25

11. What areas in your company do you see using multimedia? (Select all that apply.)

☐ Training ☐ Product announcements
☐ Corporate presentations ☐ Sales and marketing
☐ Other (please specify) ________

12. How do you usually buy computer hardware, software, accessories, and supplies?

☐ Through a local retail store ☐ Mail order
☐ Catalog ☐ Direct from manufacturer
☐ Direct from distributor ☐ Other (please specify) ________

Name: ________
Address: ________
City: ________
State, Zip: ________
Phone: ________

Thank you for your participation!
Please reduce & fax this questionnaire to (213)851-8303.

BUSINESS HOURS:
M-F 9am-5:30pm

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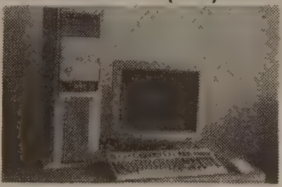

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• 2 Serial/1 Parallel/1 Game • Mid-Vertical Case • 230W UL Power Supply
Enhanced 101 Keys Keyboard

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VESA L/B 486DX2-66MHz w/256K & CPU	$729
VESA L/B 486DX-50MHz w/256K & CPU	$659
VESA L/B 486DX2-50MHz w/256K & CPU	$599
VESA L/B 486DX-33MHz w/256K & CPU	$499
ISA 486DX2-66MHz w/256K & CPU	$699
ISA 486DX-50MHz w/256K & CPU	$609
ISA 486DX2-50MHz w/256K & CPU	$585
ISA 486DX-33MHz w/128K & CPU	$435
ISA 386DX-40MHz w/128K & CPU	$178
ISA 386SX-33MHz & CPU	$118

HARD & FLOPPY DRIVES

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170MB IDE HDD	$249
210MB IDE HDD	$305
245MB IDE HDD	$349
340MB IDE HDD	$445
535MB IDE HDD	$940
210MB SCSI HDD	$359
535MB SCSI HDD	$960
1.2GB SCSI HDD	$1295
2.0GB SCSI HDD	$2149

VIDEO CARDS

MGP	$15
SVGA 256K 16-Bit	$33
SVGA 1MB 16-Bit	$59
SVGA 1MB Windows Accelerator Card	$73
Western Digital 1MB Windows Accelerator Card	$109
Diamond Stealth 24-Bit 1MB Windows and AutoCad Accelerator Card	$189
Orchid Fahrenheit VESA Local Bus 32-Bit	$210
Orchid Pro Designer II's EISA 32-Bit 256 Colors 1MB SVGA	$192
Orchid Pro Designer II's 1MB 256K Colors SVGA	$155
VESA Local Bus 1MB	$129

CONTROLLERS

IDE w/ I/O (2S/1P/1G)	$23
IDE 2FD/2HDD	$18
I/O (2S/1P/1G)	$17
VESA Local Bus IDE w/I/O Controller	$79
Adaptec 1522 SCSI II Compatible Card Only	$109
Adaptec 1522K SCSI Host Adpater w/Software	$159
Adaptec 1542 SCSI w/Bus Master Data	$469
Ultrastor 15C IDE Caching Controller exp. To 8MB	$195
Ultrastor 14F SCSI Controller 32K Cache	$210
Western Digital WD1009 16-Bit ESDI 24M-Bit Controller	$157

MONITORS

14" SVGA 1024x768, .39dp	$231
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MAG 17" SVGA 1280x1024, .28dp	$1039
NEC 4FG 15" SVGA 1024x768, .28dp	$769
NEC 5FG 17" SVGA 1280x1024, .28dp	$1330
Toshiba 17" SVGA 1280x1024, .31dp	$940
Toshiba 21" SVGA 1280x1024, .31dp	$2129
Mono 14" Monitor	$105
Mono 14" VGA Monitor	$117

KEYBOARDS

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Focus 2001	$42
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Keytronic KT2000	$44
Fujitsu 4700	$45

MODEMS

Internal 2400 Baud Modem	$34
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Internal 14.4 Send/Receive Fax Modem	$210
External 2400 Baud Modem	$59
External 96/24 Send/Receive Fax Modem	$85
External Pocket Size 96/24 Send/Receive Fax Modem	$115
External 14.4 Send/Receive Fax Modem	$230

MICE

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MTC 121ND Mini-Tower w/230W Power Supply (2x5.25", 3x3.5")	$66
MTC 122 Mid-Tower w/230W Power Supply (2x5.25", 3x3.5" Digital)	$89
MTC 123 Full-Size Tower w/230W UL Power Supply (6FDD/HDD Digital)	$119
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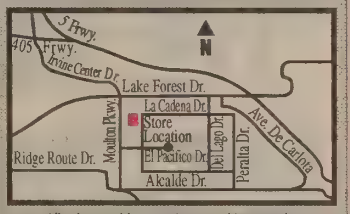

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Centris 650 8/230, CD	$2999/3299
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Apple Authorized Dealers

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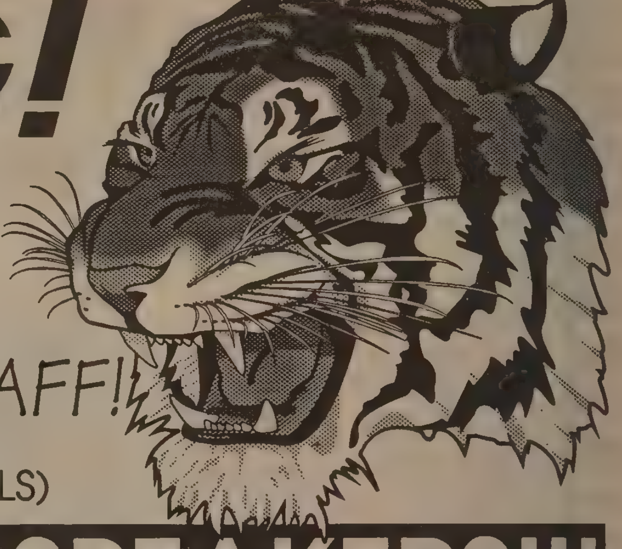

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ASSOCIATIONS

Continued from page 110

Black Data Processing Assoc., LA Chapter. Meetings: 4th Tues., 6:30 pm, ULTC, 7266 S. Figueroa St., Los Angeles. Call: (310)673-6522, 1-800-727-BDPA. [Exp. #108.]

Data Processing Management Association. Meetings: 2nd Thurs., 7:00 pm. An organization composed of all levels of management personnel who have an interest in the field of information processing. Call: (310)459-9680 or (213)225-9210. [Exp. #108.]

Independent Computer Consultants Association, Los Angeles Chapter. Meetings: 1st Thurs., 6:00 pm. Prepaid reservation, $25, or at the door, $35. The LA chapter provides referral services. Call: (213)872-1811. [Exp. #110.]

Orange County Association Of PICK Professionals. Meetings: 3rd Wed., 6:00 pm, Claim Jumper Restaurant, 18350 Brookhurst St., Fountain Valley. Dinner: Members, $20; nonmembers, $25. Without reservations add $5 additional. Call: (714)641-6347. [Exp. #110.]

Software Council Of Southern California. A nonprofit trade association whose membership is comprised of software development organizations as well as companies providing support and services to the local software industry. Call: (310)328-0043. [Exp. #112.]

USER GROUPS

ACCOUNTING

ACCPAC & Open Systems Users Group. Meetings: 7:00 pm. Irvine. Speakers and demos. Call: (714)962-4760. [Exp. #114.]

Cougar Mountain Accounting Software User Group. Call: (818)785-5880. [Exp. #111.]

ALDUS/DTP

Aldus/DTP Users Group. Free meetings, held in the Southbay and Santa Ana areas. Share ideas and gain knowledge about the standard page layout and graphic design programs on the market. Call Dave Casad: (310) 370-6269. [Exp. #114.]

AMIGA

LAAUG—Los Angeles Amiga User Group. Meetings: 3rd Wed., 7:30 pm, Veteran's Memorial Auditorium, Overland Ave. & Culver Blvd. Many SIGs, rookies, monthly PD disks. Call: Kip Hammond, (310)390-3010. [Exp. #111.]

South Orange Commodore Klub—SOCK. Meetings: 3rd Sat., 9:00 am, Computer Guild, Suite 1003, 24001 Via Fabricante, Mission Viejo. Supports Commodore and Amiga, new users SIG. Call: Don, (714)830-2430. [Exp. #109.]

APPLE

Orange Apple Computer Club. Meetings: 1st Sat., 9:00 am, Orange Coast College, Chemistry Lab. Apple II supported, presentations, and disk of the month. Call: (714)731-9243. [Exp. #112.]

Original Apple Corps, Apple II User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #108.]

ATARI

R.A.M. Atari User Group Of Ventura County. Meetings: 3rd Wed., 7:30 pm, Write: PO Box 112, Camarillo, CA 93011. Call: Tim, (805)389-0059. [Exp. #110.]

South Bay Atari Computer Enthusiasts (SPACE). Meetings: 2nd Tues., 7:30 pm, Lomita VFW Hall, 1865 W. Lomita Blvd. Active in all user interests since 1981. Call: (310)375-4839 (10am–10pm). [Exp. #112.]

BUSINESS BASIC

Business BASIC Users Of Southern California (BBUSC). Meetings: 6:00 pm, Cerritos Sheraton, Cypress Rm., 12725 Center Court Dr., Lakewood. An executive forum for business solutions using Business Basic software. Call: Christian Brantley, (714)379-5454. [Exp. #114.]

COMMODORE

C128 West Commodore 128 User Group. Meetings: 3rd Wed., 18645 Arrow Highway, Rec. room. Free membership. Call: John, (818)331-1589; BBS, (714)598-1755 FidoNet. [Exp. #112.]

C-TUG (Commodore Technical User Group). Two meetings: 2nd Thurs., 2:00 pm, 2233 N. Tustin Ave., Orange, and 4th Sun., Seniro Citizen Center, 170 S. Olive. Speakers, demos, help with any Commodore and Amiga questions. Call: Lou Palush, (714)532-1802. [Exp. #109.]

South Bay Commodore Users Group. Meetings: 3rd Thurs., 7:00 pm, SEC Redondo Generating Station, 1100 Harbor Dr. (across from King Yacht Harbor). Support for 64/128 computers. Open to all users of Commodore Computer equipment and those who would like to receive or exchange information on programs, applications, or hardware. Call: (310)324-8357. [Exp. # 112.]

Southern California Commodore User Group. Meetings: 3rd Wed., 7:00 pm, Church of the Nazarine Christian School, Rm. 18, 15000 Studebaker Ave., Norwalk. Supports C64 & 128 models. Call: Bill Davies, (310)599-1913. [Exp. #112.]

CORELDRAW

Association Of Corel Artists And Designers, Long Beach/Orange County Chapter. Meetings: 1st Tues., Farmers and Merchants Bank, 12535 Seal Beach Blvd., Rossmoor. National organization that provides support for CorelDraw and its associated programs. Call: Ken Wong, (310)835-6000 or (714)821-5378. [Exp. #111.]

Corel (ACAD) User Group. Meetings: 2nd Tues., 7:00 pm, Glendale Federal Bank Building, 401 N. Blvd. Product demos, Q&A. Call: Art, (213)935-1958. [Exp. #111.]

Santa Monica Corel Users. Meetings: 2nd Mon., 7:00 pm, Guest Quarters Suite Hotel, 1707 4th St., Santa Monica. Call: John Youngman, (310)399-3437. [Exp. #113.]

dBASE

LA FoxPro User Group. Meetings: 3rd Tues., 7:30 pm. All levels welcome. Call: Chuck, (310)539-9439. [Exp. #109.]

DESKTOP PUBLISHING

Southern California Ventura Publisher User Group (SC-VPUG). Meetings: Last Tues., 7:00 pm, 401 N. Brand, Glendale, Glendale Federal Bank Building. Product demos, Q&As, library resources. Call: (818)955-5830. [Exp. #109.]

EPSON

Epson UG/Orange County. Meetings: 3rd Sat, 10:00 am, 2151 Michelson near JW Airport, Irvine. QX, PX, CP/M, VALDOCS—support, tech, periodical & disk library, and parts. Call: (714)893-3305 [Exp. #110.]

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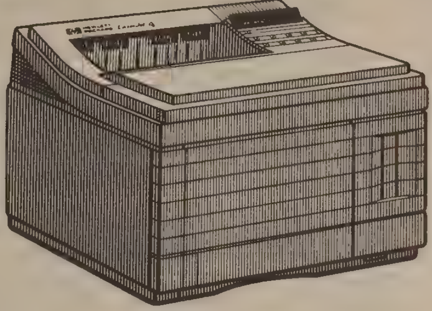

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USER GROUPS

IBM & COMPATIBLES

Aldus PC SIG. Meetings: 4th Thurs., 7:00 pm, Graphix Zone, 38 Corporate Park Circle, #100, Irvine. Call: Rick Tuning, (714)549-7352. [Exp. #111.]

Coast IBM PC User Group. Meetings: Last Sat., 9:00 am, Science Hall, Orange Coast College, Costa Mesa. Speakers, BBS, software library, newsletter, and SIGs. Everyone welcome. Call: (714)843-2048. [Exp. #112.]

Long Beach IBM PC And Compatibles User Group. Meetings: 3rd Wed, 7:00 pm, Masonic Temple, 1220 E. Market St., Long Beach. Call: Jim Wells, (310)439-7114. [Exp. #113.]

Los Angeles Computer Society. Meetings: 2nd Tues., 7:00 pm, Culver City High School Cafeteria. Live presentations and giveaways. Meetings are free. Call: (310)473-6668. [Exp. #113.]

Microlink PCUG. Meetings: 1st Sat., 6:00 pm, La Habra Sr. Center, 165 E. La Habra Blvd., La Habra. Beginners and experts welcome. Free SIG classes. N. Orange Co./San Gabriel Valley. Call: (818)961-6214. [Exp. #114.]

NOCCC Business & Spreadsheets SIG. Meetings: 1st Sun., 11:00 am, Chapman College, City of Orange. One of 22 SIGs. Call: (714)998-8080. BBS: (714)962-1857. [Exp. #108.]

Orange County IBM-PC Users Group. Meetings: 2nd Tues., 7:00 pm, Computer Learning Center, 1240 S. State College Blvd., Anaheim. Speakers, software, newsletter. Open to public, all welcome. Call: (714)990-0580. [Exp. #109.]

Pasadena IBM User Group. Meetings: 3rd Wed., 7:00 pm, 2184 N. Lake Ave., Altadena. Speakers on hardware/software, SIGs, library, newsletter, and BBS. Call: Steve Bass, (818)791-1300. [Exp. #113.]

Public Domain User Group—Los Angeles. PD software for IBM, Commodore, and CPM computers. All the latest versions.

San Bernardino Personal Computer User Group. Meetings: Last Wed., 7:00 pm, CSU, San Bernardino, University Hall, Rm. 52. Just starting so need input on meeting topics and services desired. Call: Arthur Saltzman, (909)880-5755. [Exp. #110.]

San Gabriel Valley/Inland Empire User Group (CHOMP). Meetings: 4th Thurs., 7:30 pm, Harvey Mudd College. Call: Eric Haakenson, (818)308-6025. [Exp. #113.]

South Orange County Computer Club (SOCCC). Meetings: 3rd Thur., 7:00 pm, Westminister Community Center, 8200 Westminster Ave. IBM, Apple, CP/M. Vendor presentations, newsletter, etc. Membership: $12 single; $14 family. Call: (714)964-1247. [Exp. #114.]

Thousand Oaks Personal Computer Club (TOPCC). Meetings: 4th Thurs., 6:30 pm, Goebel Senior Adult Center, 1385 E. Janss Rd., Thousand Oaks. Call: (805)495-8325. [Exp. #113.]

TUG-NET. Meetings: 1st, 2nd & 3rd Thurs., 7:00 pm, Tektronix Corp., 21300 Erwin St., Woodland Hills. Enter through back door of building, press buzzer. Call: (818)249-1629. [Exp. #110.]

Valley Computer Club. Meetings: 1st Wed., 7:00 pm, Burbank Board of Realtors Bldg., 2006 W. Magnolia, Burbank. BBS, PD library, SIGs, newsletter. All welcome. Call: Wes Arnold, (213)221-4433; or Grayce Hruda, (818)842-3707. [Exp. #111.]

Valley IBM/Compatibles User Group (VICUG). Meetings: 4th Fri., 7:00 pm, Van Nuys State Office Bldg., 6150 Van Nuys Blvd. Membership fee $25/yr. or $3 at the door. Call: Harry Tischler, (818)997-1470. [Exp. #110.]

K-MAN

Southern California KnowledgeMan User Group. Meetings: 1st Wed., 7:00 pm, Honda North America, Bldg. 300, 700 Van Ness Ave., Torrance. Call: (213)662-9910. [Exp. #108.]

MACINTOSH

The American Film Institute Mac User Group (AFIMUG). Meetings: 2nd Mon., Apple Lab, AFI, Hollywood. TV, film, and video. Call: Dave Chadderdon, (213)856-7743. [Exp. #109.]

Los Angeles Macintosh Group (LAMG). Meetings: 3rd Thurs., 7:30 pm, Dept. of Water & Power, 111 N. Hope St. So. Cal's largest all-Mac user group meetings, monthly magazine, classes, PD software, and more. Call: (310)278-LAMG. [Exp. #109.]

Orange Apple Computer Club, Macintosh User Group. Meetings: 1st Sat., 9:00 am, Chemistry Lab, Orange Coast College. Presentations and club disks. Call: (714)897-8784. [Exp. #112.]

Original Apple Corps, Macintosh User Group. Meetings: 2nd Sun. Support for beginners through experts. Write: PO Box 90065, Los Angeles, CA 90009. Call: Fred Duffy, (310)475-8400. BBS: (310)454-4660. [Exp. #110.]

San Gabriel Valley Mac User Group. Meetings: 1st Thurs., 7:30 pm, Pasadena Central Library Aud., 285 E. Walnut. Call: (213)684-ICON. [Exp. #111.]

South Bay Apple Macintosh User Group. Meetings: Last Wed., 7:30 pm, Pacific Elementary School, 1214 Pacific Ave., Manhattan Beach. Call: (310)644-3315. [Exp. #109.]

Whittier Area Mac User Group. Meetings: 2nd Sat., 10:00 am, Christian Family Friendship, 11209 First Ave., Whittier. Call: (310)947-2447. [Exp. #111.]

OS/2

LA OS/2 User Group. Meetings: 3rd Thur., 6:30 pm, IBM, 21041 Burbank Blvd., Woodland Hills. Call: Paul Duncanson, (805)584-8732. [Exp. #108.]

West LA OS/2 User Group. Meetings: 1st Wed., 7:30 pm, IBM, 2525 Colorado Place, Santa Monica. Catering to the technical needs of the corporate community. Call: Tracy Ragan, (310)285-3155. [Exp. #112.]

PROGRAMMING LANGUAGES

APL User Group—SoCal SIGAPL. Meetings: 2nd Wed., Los Angeles City College. Membership includes newsletter. Call: G. Smith, (213)560-2174. [Exp. #109.]

Forth Interest Group, Los Angeles Chapter. Meetings: 4th Sat., 10:00 am, Joslyn Center, 339 Sheldon St., El Segundo. Discussions, presentations, and tutorials include Forth, C, J, smalltalk, C++, OOP, hardware, algorithms, and operating systems. Call: John LuValle, (818)797-1820. [Exp. #109.]

SGML

SGML (Signal Generated Markup Language) User Group, Southern California Chapter. Discussions, presentations, tutorials, networking, and educational forums applying to SGML. Call: Roger Waston, (310)337-0309. [Exp. #112.]

TEXAS INSTRUMENTS

TI/944A Home Computer User Group. Meetings: 2nd Mon., 7:00 pm, Pomona First Federal, 9090 Central Ave., Montclair. Monthly newsletter, demos, and fairware. Call: (714)627-3403. [Exp. #110.]

UGOC. Meetings: 2nd Mon., Fidelity Federal, 13820 Seal Beach Blvd. Call: John Bolda, (310)421-1827. [Exp. #113.]

THEOS

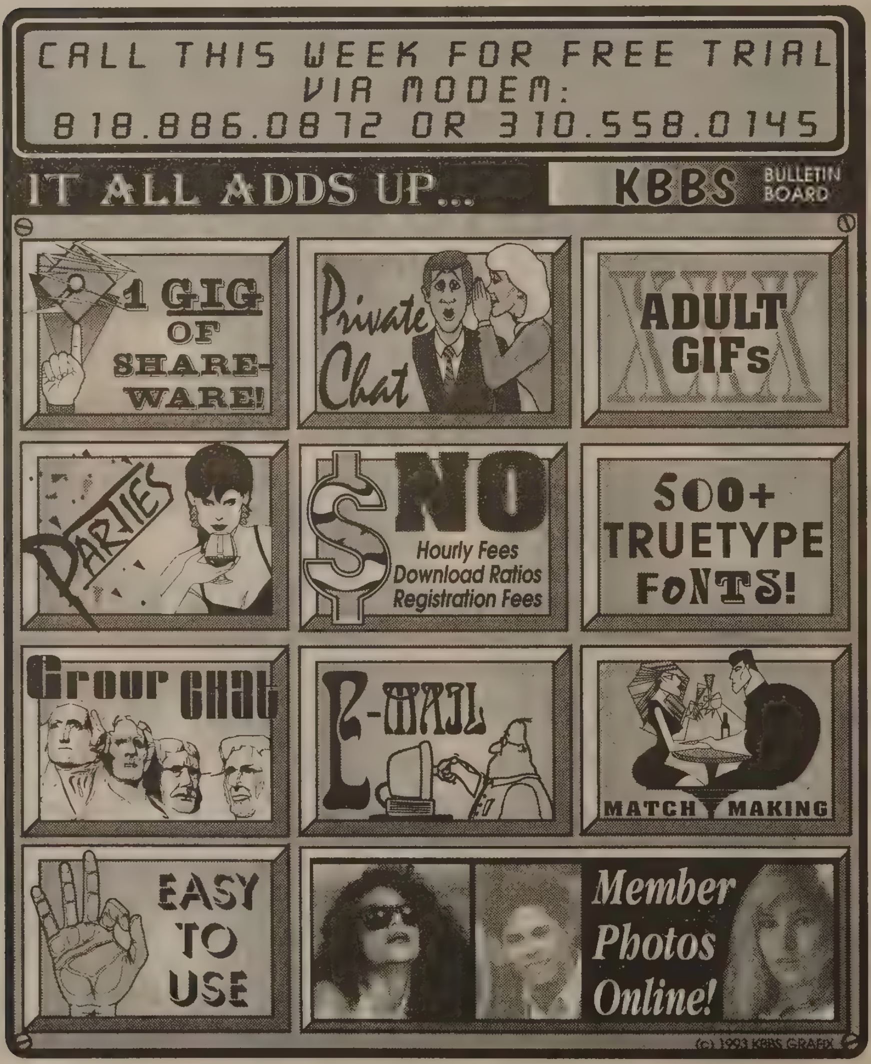
THEOS User Group. Call: Fred Bellemy, (805)965-0265. [Exp. #108.]

VIDEO TOASTER

Digital Video Forum. Meetings: 3rd Wed., 6:00 pm, Pacific Video Products, 1100 Gene Autry Way, Anaheim. The Video Toaster and associated devices and software is the primary interest. Broad focus of group is the rapidly evolving world of Video/Graphics. Call: Scott Davis, (714)647-5822. [Exp. #112.]

VIRTUAL REALITY

Virtual Reality Special Interest Group (VRSIG). Meetings: The Electronic Cafe, 1649 18th St., Santa Monica. Call: Dave Blackburn, (310)545-0369. [Exp. #110.]



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You can update or renew your listings at any time. If yours is missing, send us a new one! Send your listing information to: US Mail should go to: MicroTimes User Group, 3470 Buskirk Ave., Pleasant Hill, CA 94523. **Faxes** are welcome at (510)934-2417 or (213)851-8303.

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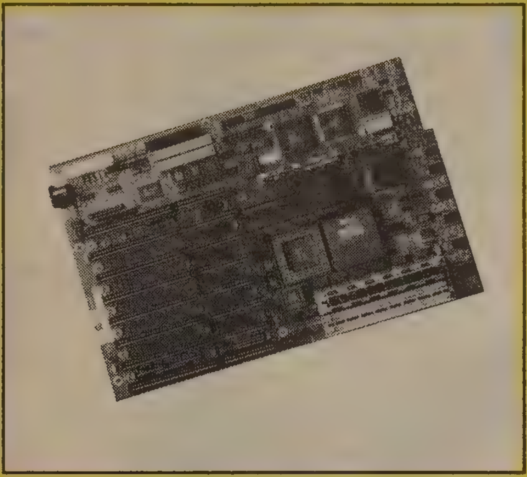

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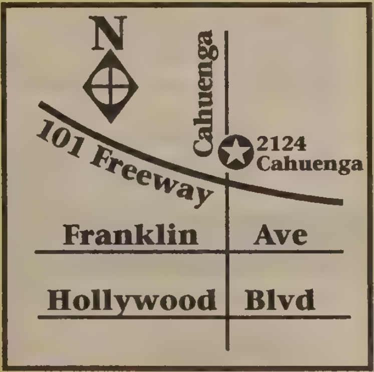

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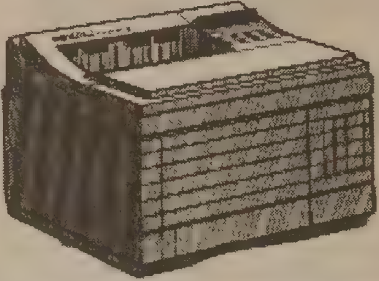

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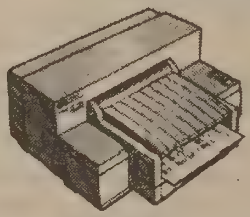

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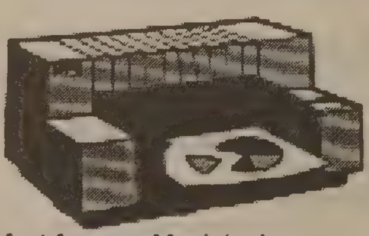

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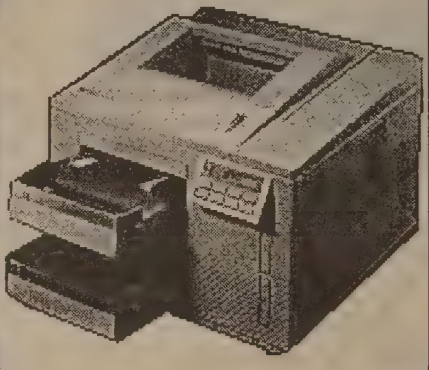

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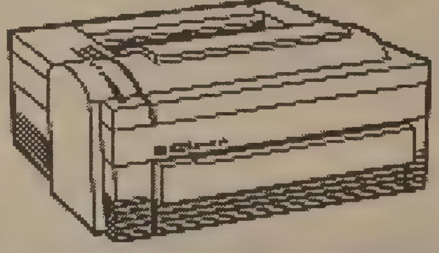

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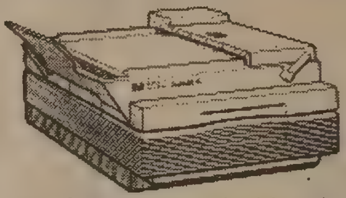

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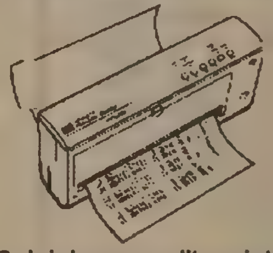

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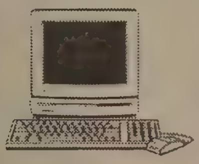

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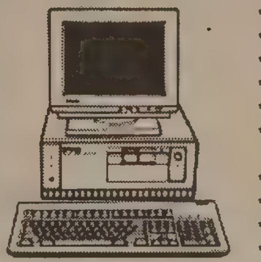

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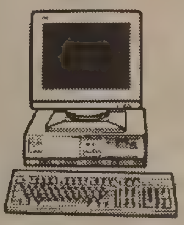

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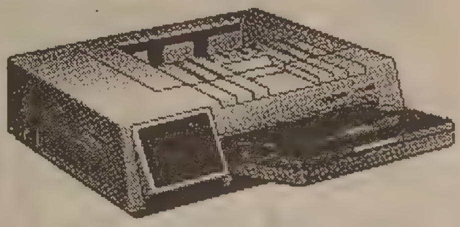

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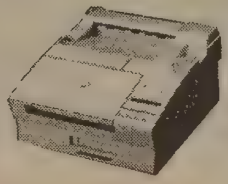

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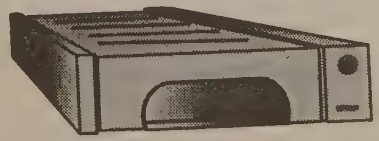

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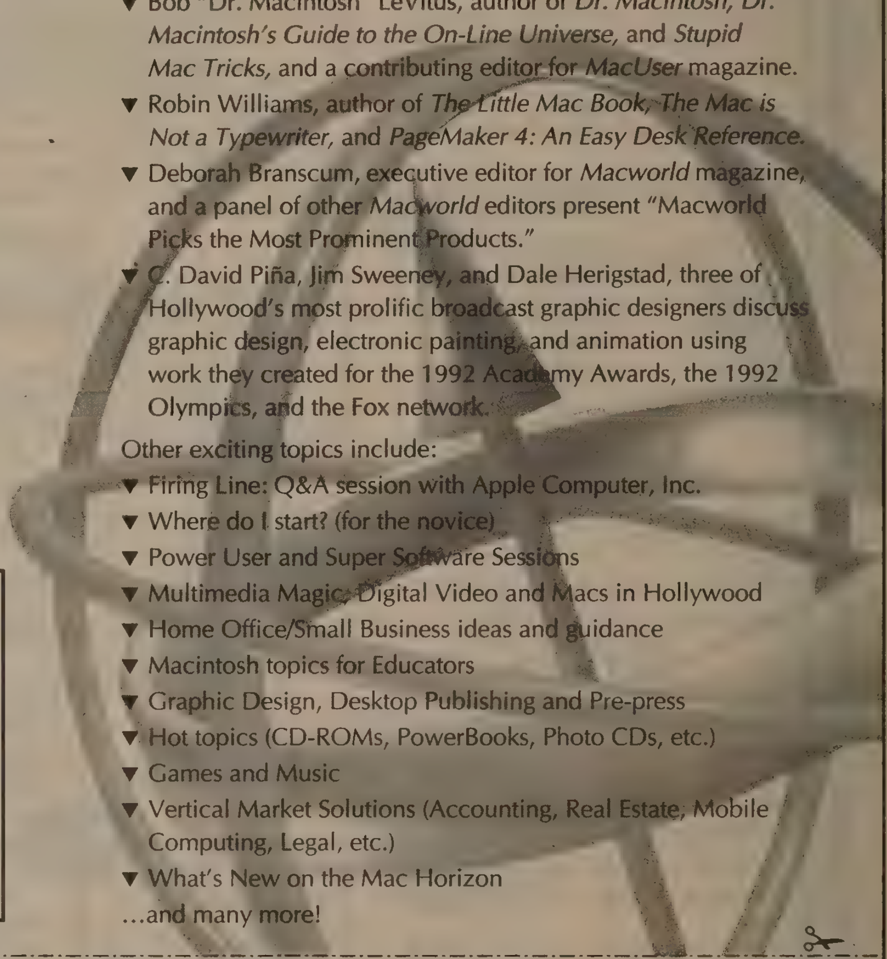

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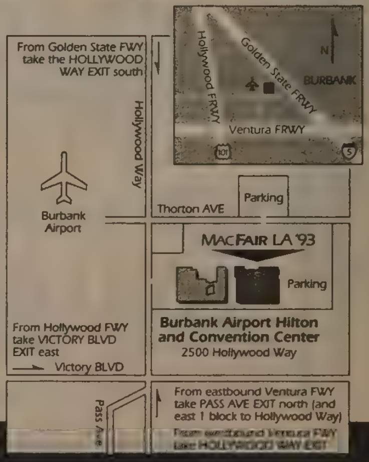

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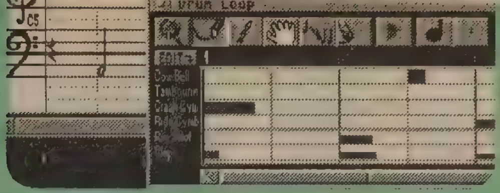
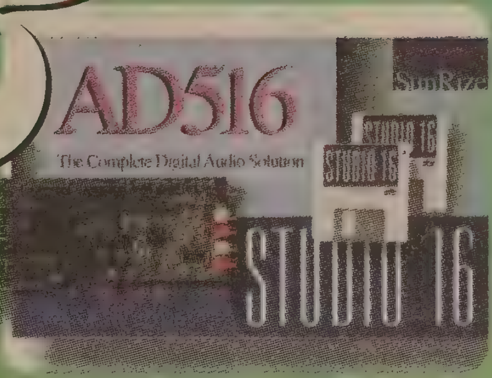
Multi Media & beyond

Sound on the Amiga; professionals on "what is multimedia?"; the inside story on 3DO hardware.

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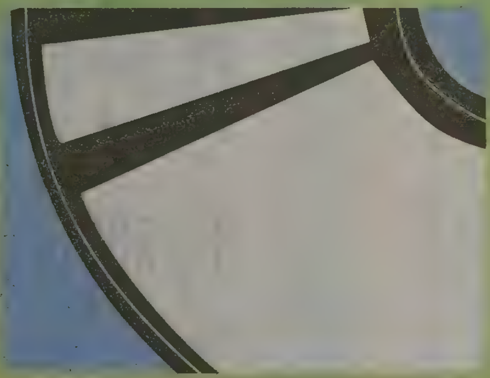

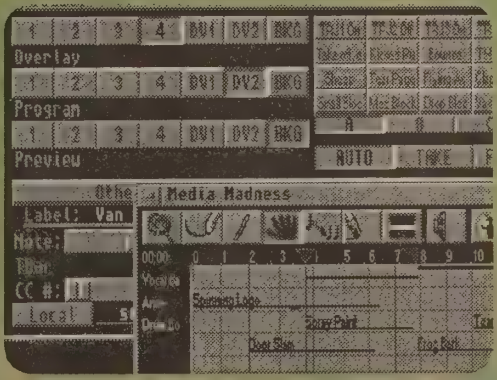
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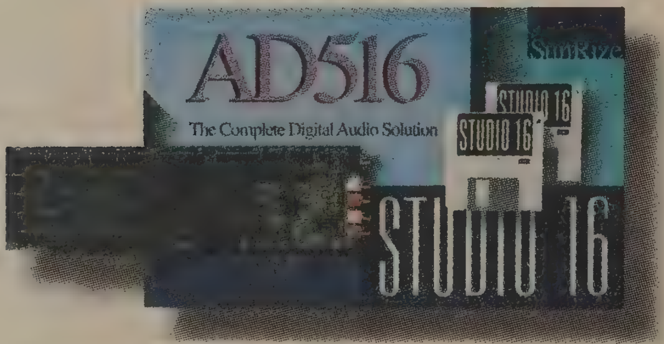
The Amiga Recording Studio

The AD516 and Bars&Pipes Professional 2.0



BY DOUGLAS J. NAKAKIHARA

Good news for the sound studio on a budget—SunRize Industries has released the AD516, a 16-bit digital sound board for the Amiga.

Though its $1,495 price tag may seem high, the board's performance eclipses anything available on the Amiga or competing PC platforms in that price range. Other products may boast 16-bit sound, but few feature direct-to-disk recording—essential for working with long 16-bit sound samples because of their tremendous size—and you'll be hard pressed to find one that can handle eight tracks of sound.

The bundled Studio 16 program operates like a multitrack tape recorder, so it's very simple to use. As with its conventional counterpart, you can listen to some tracks as you record on others. Simulated analog and digital level meters can monitor both input and output levels.

The eight-track limitation applies only to the number of sound samples that can be played at the same time; the total number of samples you can work with is limited only by your storage space! Since sound is manipulated entirely in the digital domain, merging (aka "bouncing") tracks together produces no degradation in sound quality. So when you've reached the maximum number of playable tracks on the AD516, merge them all down to two stereo tracks and fill the unused tracks up again. The only thing you lose is the ability to manipulate the merged tracks individually. Unless you delete the source sample files, they can still be used at a later time.

Other reviews of the AD516 have chiefly

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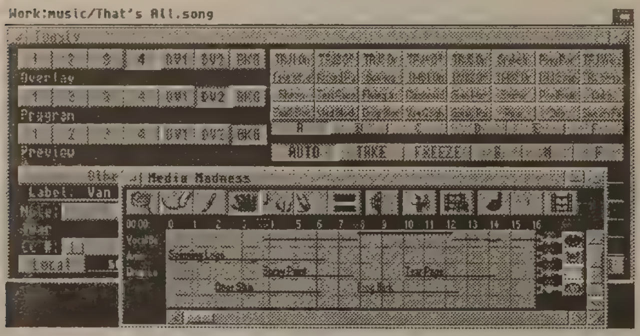
discussed its desktop video use. However, I wanted to test its ability to operate simply as a multitrack recorder, so I tried it out on a song I had composed in a music sequencer. The song used sounds from a Roland MT-32 via MIDI plus the Amiga's own internal 8-bit voices. By multitasking the sequencer program and Studio16, I was able to feed the MT-32 and Amiga audio output back into the stereo input jacks on the AD516! I don't believe this can be done on any other PC.

The resulting samples were indistinguishable from the original. Next I recorded a few additional tracks of synthesizer licks. I merged these down to a single track and added a couple tracks of vocals. I was in digital heaven, able to bounce track after track without any tape hiss! The result was a technical masterpiece—if only I could write a decent song. In any event, I proved it could be done.

LIMITATIONS

The biggest limitation in using the board as a multitrack recorder is that the board has only two input and two output channels (for stereo). Because of this, it is only possible to work externally with two tracks. Any effects (e.g., reverb) have to be added either to the source input while recording or to the mixed-down output.

In a normal recording studio situation, many tracks are recorded "dry" with effects added independently to each track on playback. This allows effects to be adjusted after the fact. For the home studio, this is a tolerable limitation, but requires a little preplanning. Fortunately, the AD516 has a full suite of waveform editing tools. For example, delay-based effects, like reverb, flanging, doubling, etc., can be added to a track.



Another limitation is that there are no provisions for "punching in" while recording. So if you want to add something just to the chorus of a song, you have to start recording from the beginning of the song; you can't just jump to the chorus and start recording from there. A possible solution may be to cut and paste pieces of a song together, using the waveform editor or triggering parts with SMPTE.

Though the board supports up to eight tracks, the number of tracks you can simultaneously record or play back depends mostly on your Amiga's processor speed, your hard disk data transfer rate, and the desired sample rate. On a stock Amiga 3000, I was able to do six tracks at 44.1 KHz, the standard rate for CDs. Lowering the sample rate will increase the number of possible tracks. (Note that removable media drives may seem to be ideal until you realize their slowness will impact the AD516's performance.) The documentation indicates that the AD516 will play four tracks on an unaccelerated Amiga.

In any event, be prepared to buy a huge hard drive. A single CD-quality sample can use 5 MB of disk space per minute at a sampling rate of 44.1 KHz. Multiply that by the number of tracks and the length of the song, and a 200MB hard drive can seem puny!

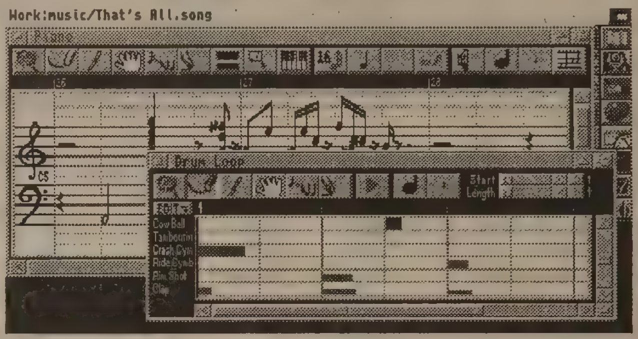
Of course, the AD516 was not designed to replace a multitrack recorder, so the above limitations are understandable. However, it can certainly perform impressively in a home studio situation. The AD516 would, at least, be a welcome addition to any conventional recording studio.

DESKTOP VIDEO

The AD516's most likely use is for adding sound to video.

With respect to video, you'll often hear the term SMPTE (pronounced SIMP TEE). Basically, SMPTE is a standardized method to keep track of time or position on tape. It is used to synchronize events, usually audio and video. SMPTE is accurate to the frame—that is, events such as a sound effect can be triggered to start at any specific frame in a video. The SMPTE code format is Hours:Minutes:Seconds:Frame. Any of the various frame rate standards (24 fps, 30 fps, 30 fps drop frame, etc.) can be used.

SMPTE is usually implemented as an audio track. You can actually hear this track, but it sounds like static. This static can be translated by your computer into linear information, much like a tape counter on a VCR. The SMPTE code is usually recorded onto an audio track on the tape containing the video and acts as a position reference for anything that understands SMPTE. This is called "striping" a tape.



SunRize sells a software product called SMPTEout that generates the SMPTE audio track right out of the Amiga audio port, so you no longer have to purchase separate hardware to generate the SMPTE track.

Let's say you've put together a nice video using NewTek's VideoToaster and the tape has been striped. You've also got all of the background music, voiceovers, and sound effects all sampled. You also know the exact frames where each sound should start.

From this point, all you have to do is set up a Cue List in Studio 16, where you enter the trigger point in SMPTE time code for each sample. By connecting the audio out from the VCR to the AD516 SMPTE input jack, your Amiga will "listen" to the SMPTE audio track and trigger all of the sound samples based on the information in the Cue List. The AD516 can also be controlled using ARexx.

I know I'm making this sound way too easy, but essentially, this is how it works.

BARS&PIPES

Blue Ribbon SoundWorks has released a powerful music sequencer, Bars&Pipes Professional 2.0 (B&PPro), that works superbly with the AD516. At its core, B&PPro is a full-featured music sequencer. Notes are usually input using a MIDI keyboard, but the computer keyboard and mouse can also be used. Generally, each track's output is sent to a MIDI device or the AD516.

B&PPro also supports SMPTE, so instead of using Studio16's Cue List, you can define the sample trigger points using B&PPro. B&PPro's input interface is time-line-based,

RESOURCES:

AD516, $1,495
AD1012, $595
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SunRize Industries, Inc.
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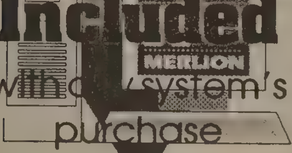

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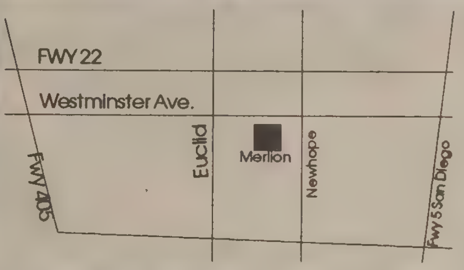

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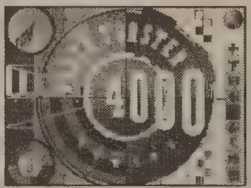

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so you may find it easier to work with.

Basically, AD516 samples are assigned to notes. When a note is played, the corresponding sample will be played through the AD516. (These samples do not behave like normal instruments. That is, the pitch of an AD516 sample cannot be changed via B&PPro. You are limited to playing the sound at its recorded sample rate. This is much different from the typical "keyboard sampler" sold in music stores, where a sampled sound can be varied in pitch and used as an instrument. I was told by SunRize that it is theoretically possible to make the AD516 work like a keyboard sampler, but it would involve resampling the sound on-the-fly, and keep you from using eight tracks at once.)

Using B&PPro instead of the Cue List is also more versatile since you can simultaneously control MIDI instruments and other events. B&PPro also has a feature called Time Line Scoring, where entire songs can be triggered using SMPTE timecodes.

> SunRize sells a software product called SMPTEout that generates the SMPTE audio track right out of the Amiga audio port, so you no longer have to purchase separate hardware to generate the SMPTE track.

Despite its comic book-like interface, B&PPro is an extremely powerful and complex sequencer. I strongly suggest that you set aside a large block of time and go through the nearly four hundred pages in the manual. It took me a while to get the hang of it, but eventually it seemed surprisingly intuitive.

Essentially, music flows from left to right through a series of pipelines. The input pipeline holds the tools that process the music before they reach the sequencer area. The sequencer area holds the actual note information. The output pipeline holds the tools that further process the music before it is sent out, usually to a MIDI device.

Many tools are available. Some work only on the input pipeline, some only work on the output, while others work on both. Multiple tools can be combined into a custom Tool. Novice musicians will like the tools that automatically add the proper accompaniment to a song, once certain song parameters are set. These include tools for automatic counter melody, harmony, and chords. Another tool prevents out-of-key notes from being processed. You can even write ARexx scripts that generate MIDI events.

The pattern tool allows you to play the same short segment of music over and over, a set number of times. You can then add and remove notes on-the-fly. This allows you to build a music segment piecemeal. Multiple

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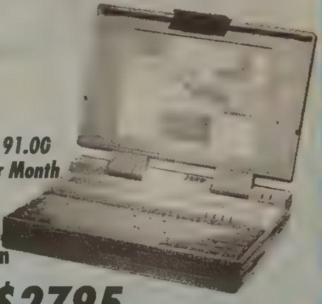

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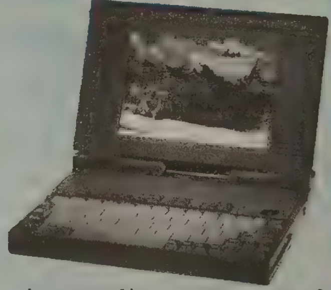

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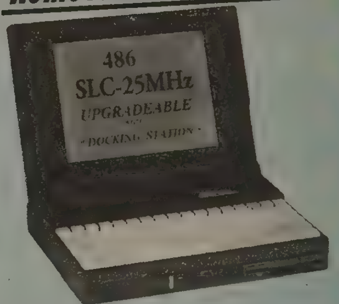

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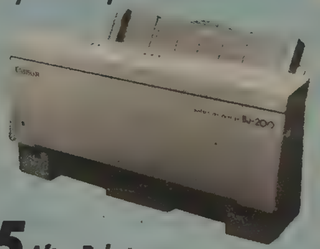

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patterns can be chained in one track to perform multiple sections of music. This feature is very good for sequencing percussion, which is normally very repetitive.

Some of the tools are somewhat obscure, but fun nonetheless. These include tools like flip, which flips the notes around a center note, and reverse, which reverses all of the notes in a range. Use the inverter tool to squeeze all notes into a preset range.

I loved the fact that the display can be set to standard music notation, piano roll display, or a hybrid of both. There are even provisions for adding lyrics and music printing.

A great little editing feature is song construction. Using a grid representing the tracks of music, you can insert, delete, and move any block of measures. This gives you a quick way to arrange a song without having to edit each track individually.

The optional Internal Sounds Kit, which I highly recommend, will allow you to use standard IFF sound files as instruments. Though the sounds would only be 8-bit, the fidelity is still reasonably good. In fact, a few years ago, KPWR Power 106, a major radio station in Los Angeles, played a song I did which only used my Amiga's internal sound channels. I'm sure they thought I used lots of expensive equipment.

Media Madness is an interesting twist to B&PPro. These specialized tools allow control of Video Toaster transitions, IFF images, animations, and sound samples, the GVP IV24 and genlock, the Panasonic optical disk, MediaPhile, Scala, the AD516, SuperGen 2000, and the Amiga narrator device. These multimedia sequences can be saved and played back using a freely distributable player program.

All in all, the AD516-B&PPro duo does practically everything except write the music for you—and it almost does that! If the AD516 is too pricey for you, SunRize offers a four-track 12-bit mono version called the AD1012. (Special thanks to Dean Tucker at SunRize and Allison Landry at Blue Ribbon SoundWorks for their help in getting me their products for review.) ■

In any event, be prepared to buy a huge hard drive. A single CD-quality sample can use 5 MB of disk space per minute at a sampling rate of 44.1 KHz. Multiply that by the number of tracks and the length of the song, and a 200MB hard drive can seem puny!

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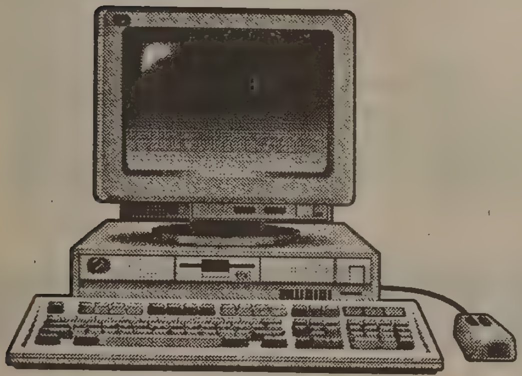

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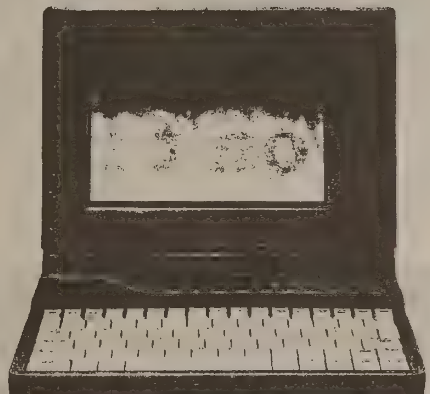

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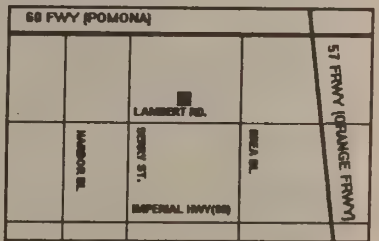

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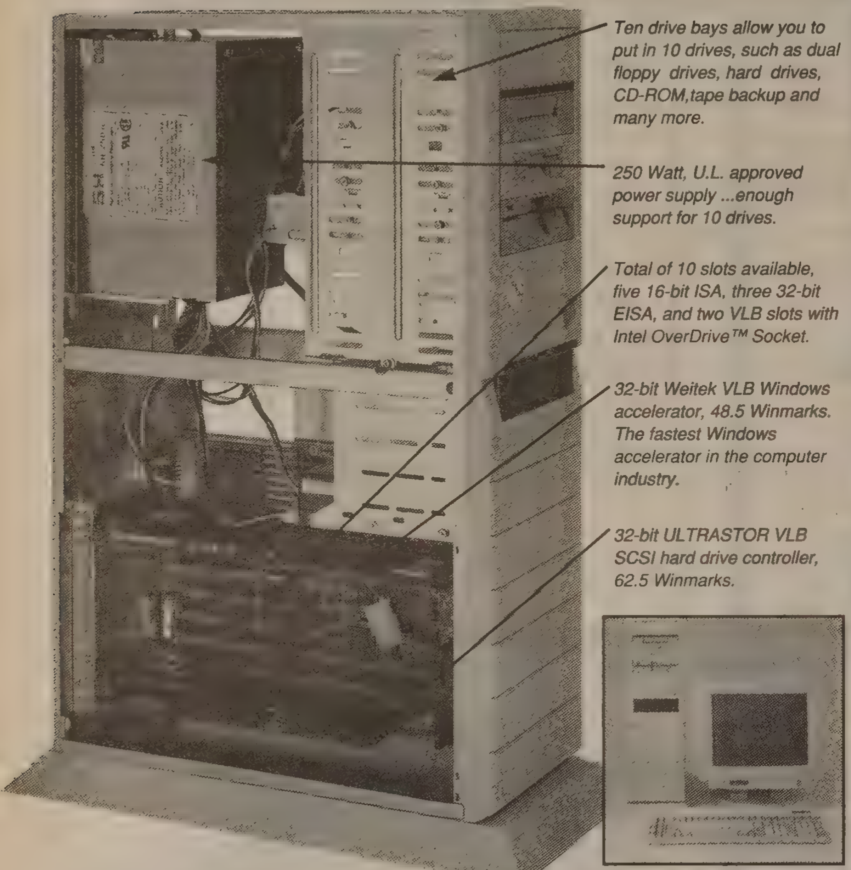

Ten drive bays allow you to put in 10 drives, such as dual floppy drives, hard drives, CD-ROM,tape backup and many more.

250 Watt, U.L. approved power supply ...enough support for 10 drives.

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Here's how fast !!!

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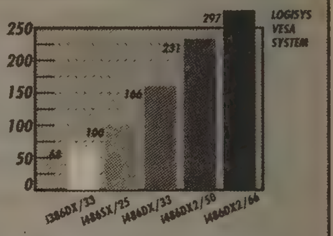
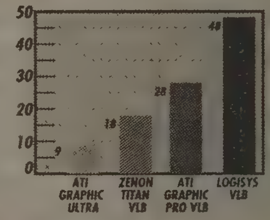
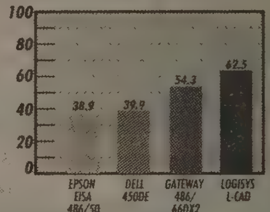


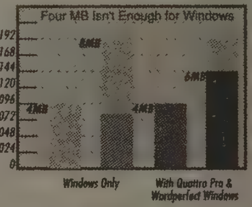
2. Why settle for slow windows video?
Logisys systems include a high performance Windows accelerator combined with a VESA standard Local Bus! Why is Local Bus faster? The i486 is a high speed 32-bit processor. Video cards plug into a slot in your PC, called a bus connector. The standard PC bus was designed for an 8MHz 286, therefore it's confined to 8MHz and 16-bit. Logisys' VESA Local Bus runs up to 33MHz and 32-bit. Turn on your VESA system and watch Windows scream.



3. Compare hard disk speed!
We've put our Fast SCSI-II HD controller on our 32-bit VL-Bus system for super performance! It's in our EISA SCSI high-end system. Measured by industry-standard benchmarks like Logisys -Lab's Winbench 3.1, it blows-away Gateway, Dell and EPSON'S fastest EISA or VLB systems.



4. 8 Megabytes of memory!
Running Windows? Don't run out of memory! When Windows runs low on memory, it starts using your hard drive like memory. Memory is 200+ times faster than a hard drive -- don't get caught short! Logisys includes a full eight Megabytes of RAM in every VESA system.



L-Graphic

EISA & VESA System

- Two 32-bit VL-Bus, Three 32-bit EISA & Five 16-bit ISA Slot
- Intel Pentium OverDrive™ Socket
- 256K Fast Write-back Cache
- Weitek P9000 Video Coprocessor VLB 32-bit Windows accelerator, 1MB DRAM, 2MB VRAM, 76Hz refresh rate, 48.5 million Winmarks
- 8MB RAM, 70ns High Speed RAM
- 250MB IDE 12ms Hard Drive with Cache
- 32-bit VESA IDE Controller
- 15" Flat-screen NI Monitor, 1280 x 1024, 30% larger edge-to-edge viewing
- 101 Key Click Keyboard
- 2 Serial, 1 Parallel & 1 Game Ports
- 1.2 & 1.44MB Floppy Drives
- MS-DOS 6.0, Windows 3.1 & High Resolution Mouse

Upgrades

- Award-Winning 17" MAG Digital Flat-screen Monitor, 1280 x 1024, .26 dpi........ADD $600
- 32-bit VL-Bus IDE Controller, 2MB Cache, Exp. 16MB........ADD $170
- 180MB Intelligent Removable Hard Drive........ADD $600
- Focus 9001, 130 Key Keyboard w/Calculator........ADD $ 40

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486DX2-50.............$2,480
486DX2-66.............$2,600

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- 101 key Click Keyboard
- 2 Serial, 1 Parallel & 1 Game Ports
- 1.2 & 1.44MB Floppy Drives
- MS-DOS 6.0, Windows 3.1 & High Resolution Mouse

Upgrades

- Award-winning 17" MAG Digital Flat-screen, 1280 x 1024, .26dpi........ADD $600
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486DX2-50.............$2,385
486DX2-66.............$2,500

L-Windows

VESA System

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- Intel Pentium OverDrive™ Socket
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- 8MB High Speed 32-bit RAM
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- 101 Keyboard
- 2 Serial, 1 Parallel & 1 Game Ports
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- MS-DOS 6.0, Windows 3.1 & High Resolution Mouse

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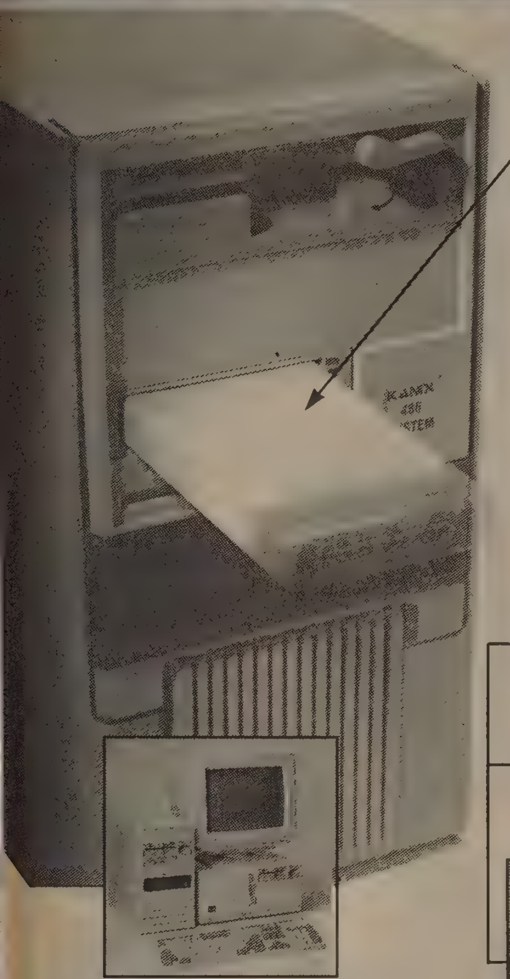

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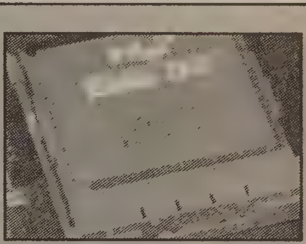
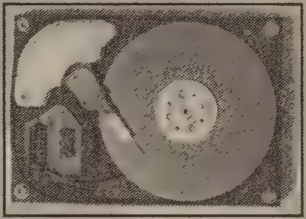
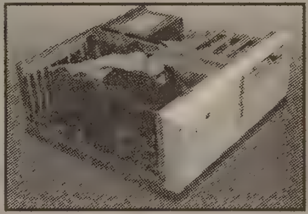
Intelligent RHD components include: cartridge, intelligent IDE card & frame.

L-Media & L-value system choice mini tower or desktop (CTX Monitor)

Here's how upgradable !!!







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Multi & Media beyond

MULTIMEDIA 101

It's All A Matter Of Definition

BY JONATHAN E.

One of the metaphors for multimedia is that it's like that classic line about Los Angeles—thirteen suburbs in search of a city. With that in mind, I asked the participants in the Muchomedia conference on The WELL for a wide range of definitions of multimedia. The results were more focused than I expected, pointing toward the real economic engine of digital information and entertainment rather than the home-brew, garage-made variety of diverse possibilities.

Kevin Michael Rardin replied with a rather depressing observation: "The term 'multimedia' is first and foremost a buzzword that an industry is trying to wrap itself around. A friend and I have been having lengthy discussions about 'just what multimedia is, and we've both been pretty immersed in it for the past year working on different projects. Our most recent conclusion is that it is really nothing more than plain old ordinary TV. That's right: television. Whether you interact with it by plugging in a cassette tape and watching it or click buttons on a computer screen to navigate it or even use a Sega controller to play it, it all ends up being viewed on some kind of RGB device that's customarily referred to as a TV.

"Content, levels of interactivity, and such may vary from platform to platform, but with the coming proliferation of bandwidth for cable TV everything currently called 'multimedia' will be viewable/interactable/etc. on TV and nothing more. TVs may change with resolution enhancement but they're still going to be TVs. The idea that hundreds and potentially thousands of people are developing new ways of using television is great. Gotta fill up that bandwidth! But to try and distinguish the process or the 'industry' as anything more than television production or call ourselves anything other than 'media producers' is, to my mind, foolish and misses the point. Multimedia is TV; nothing more or less."

Robert Lauriston pointed out that "multimedia's a pretty broad term, including everything from opera to performance art to Cirque du Soleil. The computer industry's use of the term can be translated into English as, 'Are we selling expensive hardware yet?'" As far as digital multimedia is concerned, he agreed with Kevin "except that there is a significant distinction between what's possible on a personal computer and what's possible on a souped-up TV set, and that disparity will remain for at least several years and perhaps much longer."

Tim Victor argued that "the problem with simple definitions like this is that they wind up redefining TV as well as multimedia. If

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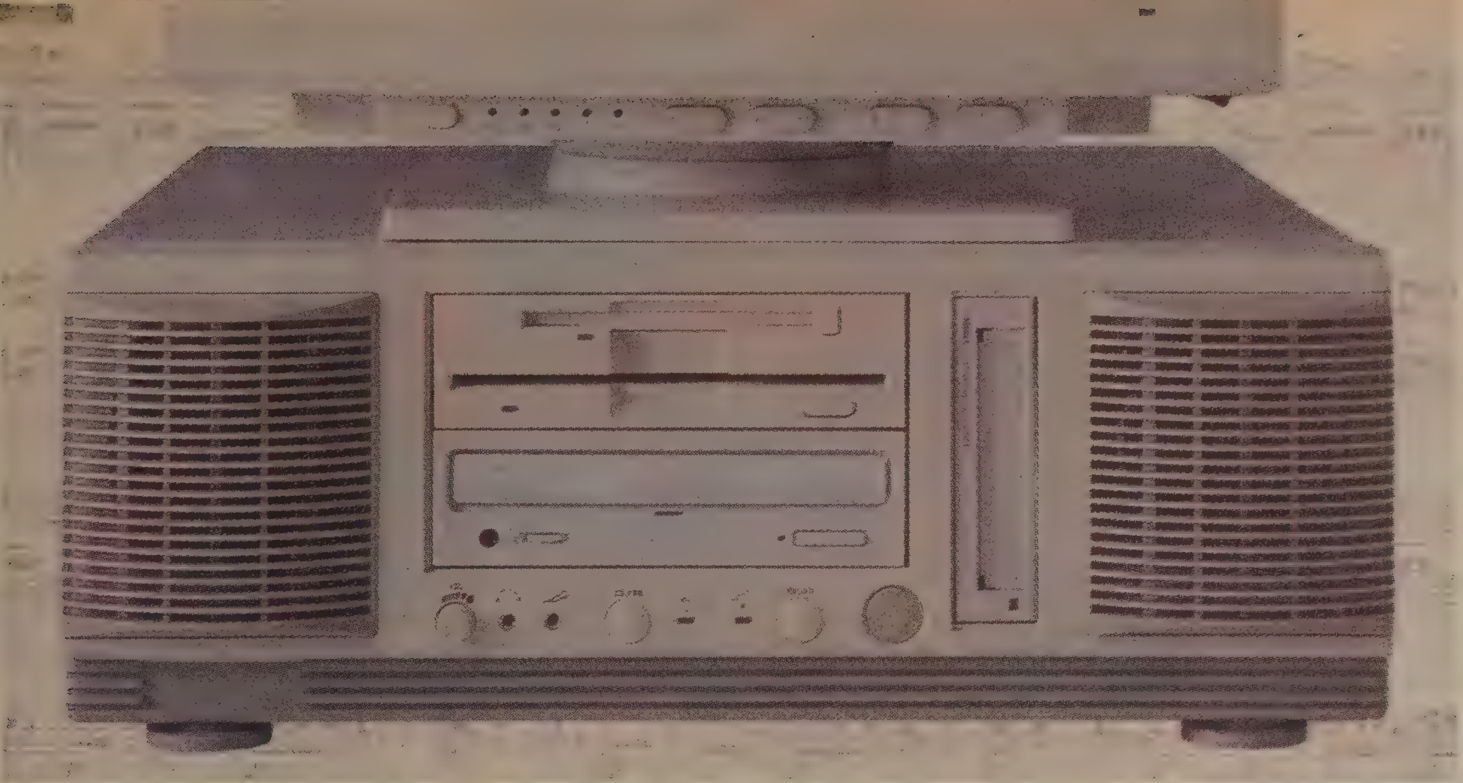
Jonathan E. has worked with desktop multimedia since 1988. He also writes about world music and the Archaic Revival for BAM. His USPS mailing address is c/o SoundSwell, 54 29th St., Richmond, CA 94804. His email address is jeve@well.sf.ca.us



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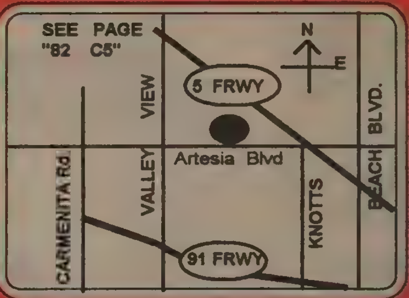

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multimedia is TV, then TV is something other than what I grew up watching."

However, he went on to say, "I do think there's a lot of merit in what Kevin's saying. Even if the TV becomes fully interactive, a lot of the interaction will just be telling it what you want to watch next." As far as "what's possible on a personal computer and what's possible on a souped-up TV set," he thinks "there's a lot of interesting places in there, many of which are being explored already. If you think of CD-I et al. as souped-up TV sets, how far away from computers are they? What's the key difference? A typewriter-style keyboard? A hard drive? Component rather than composite video?"

The basis of Kevin's concern became apparent in his reply: "I was trained in instructional technology back in the late '70s when 'multimedia' had a meaning: multiple media. We had to learn how to combine slide projectors, movie projectors, stereo sound systems with mixers, lights, speaker lecterns and such into a single thoughtful presentation. I believe these are the roots of what we call multimedia today.... The TV I grew up watching is already changed by at least one if not several orders of magnitude, but it's still TV. By the time this industry grows to fill the five hundred channels TCI/Time-Warner et al. are talking about, it'll still be TV. It will probably combine the multimedia technologies of the '60s and '70s (which is all we're really doing now with our computers) with the broadcast technology most people accept as TV now. Certainly levels of interactivity will rise; resolution and performance will increase and a computerized interface will be mandatory. But the audience will still perceive it as TV and still ask each other 'What's on TV?' And the audience is who pays the bills. Work for them and you'll get paid."

The vital impetus behind multimedia came from attempts to improve educational techniques.

Tom Mandel agreed, "but only up to a point. Most of the early stuff—advanced pay-per-view systems and entertainment video on demand—will be just TV, with a bit more convenience. But that's not all there will be."

TV OR NOT TV?

Chris Meyer expanded the discussion with a return to basics and a recognition of the burn-out that many early multimedia pioneers experience from time to time. "When I am in a positive mood, I say, 'Multimedia is the combination of any number of media types you choose to best get your idea across.' When I am tired of the M-word, I say, 'The first time someone put a picture next to type in a book we had multimedia, so it's nothing new; we're just getting more tools and chances to integrate it.' Lately I say, 'Games are the purest form of interactive multimedia; and maybe the only profitable one.' Ah, but I tripped into another one there at the end—some assume 'inter-

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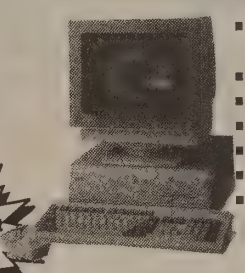

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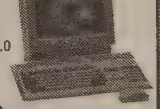

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active' when you say 'multimedia'; I think the qualifier still needs to be there, since you can have linear or static multimedia."

Suzanne Stefanac remembered that "the nuns who indoctrinated me called corny slideshows with music alongside 'multimedia.' We liked the word, kinda reminded us of rocket science. Now I think it just means wider bandwidth. Sound, motion, and interactivity are pluses that enhance some vehicles—rote learning, catalogs, adventure games, and (someday) encyclopedias. The fact is, widen the highway and data will follow. Lots of it will be bad, but that's the way the bell curve bounces."

> We are currently at a point where bright ideas, even with a relatively low budget, may meet with success and even shape the future.

Steve Krause distinguished multimedia from television with his comment that "another useful way of thinking about multimedia (and one that differentiates it from traditional television) is to see it not only as multiple media but also as a single, digital metamedium." He then neatly encapsulated both the present state of multimedia and what may be. "The fact that various media are all going digital allows some extraordinary new possibilities with this new metamedium, but the technology and the tools for exploiting the technology are at very early stages. Thus, we have an industry driven more on the promise of what can be done than the reality."

WHAT MAY BE

These observations and definitions point toward a couple of undeniable features of multimedia. Its future in the consumer mass market will be highly reliant on Hollywood-style entertainment. And the hardware in that market will be closer to "a souped-up TV" than what we recognize as a personal computer today. Early examples of what might be coming along are the Sony Multimedia Player, Photo CD, and CD-I. All of these products have provoked disdain in some degree from those more used to real computers. I think part of this disdain comes from these products' technical shortcomings, but a possibly larger part comes from the cultural model they are based on—which is TV.

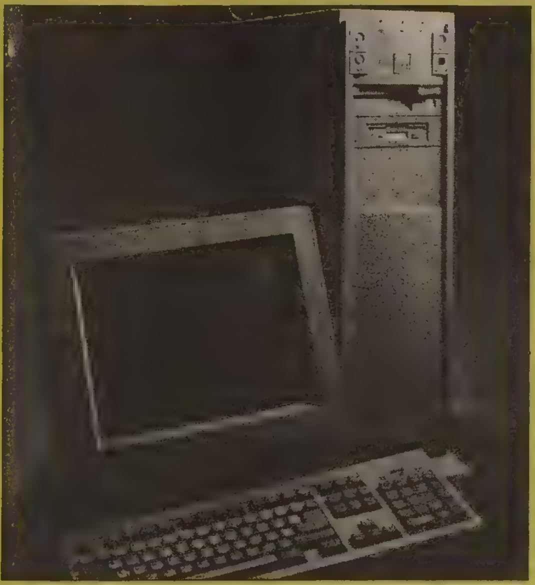
However, CD-ROM (in whatever format) is only a stop-gap large storage medium. In ten years time, CD-ROM will have approximately the status of vinyl LPs today. Every corporation with fingers even near the pie is feverishly scurrying around to get your house wired or fibered or wirelessed so you can download whatever passes for entertainment then. It's going to be a crazy ride on the way there. The engineering and design problems are immense, financial constraints will slow some parts of this plan down, and the ongoing battles over government regulation will be fierce.

This is a long way from the idealism of multimedia pioneers. The vital impetus behind multimedia came from attempts to improve educational techniques. In this area there have been many worthy programs and products with some success and some that needed rethinking. However, the real problem is that there is no economic engine on the scale of the entertainment industry. Education has now become a secondary concern for the driving forces of multimedia.

However, we are currently at a point where bright ideas, even with a relatively low budget, may meet with success and even shape the future. As has been said over and over again, content is crucial. The software and hardware will continue to evolve, platforms will converge and mutate, for the truly profit-driven entrepreneur there'll never be enough machines out there—but this is the time to line up your ducks as far as the conceptual work of creating the medium is concerned.

Desktop multimedia content so far can be crudely summed up as text with pictures and sounds attached. This will surely be an important category for some time to come. There are plenty of ideas waiting to be put into effect. Previously published books offer fertile ground for multimedia treatment; although many progressive thinkers feel that this is not a very exciting use for multimedia. However, authors with ideas that are difficult to compre-

TAKE A CLOSER LOOK AT
VALUES THAT PROMPT A COMPARISON



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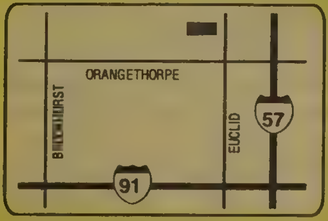

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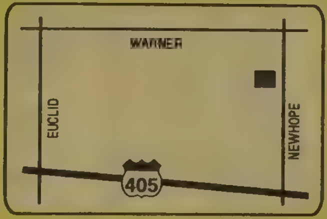

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hend and who have substantial video and audio aspects to their work, such as Terence McKenna (and he even has a software component), would make close-to-ideal titles. Mickey Hart is another example in this category. Multimedia magazines have been tried, but none seems to have quite cracked the problem. A specialist music magazine with a variety of critical opinions about the same piece of music and with that music available at the click of a button is something I'd love to see and hear. Art history and appreciation is yet another area that seems ideal, using a video narrative as backbone with plenty of options to see other works and call up background information.

However, what the world is waiting for is the multimedia D. W. Griffith. Think about it.

GET OUT OF THE HOUSE

There are a couple of interesting opportunities coming up to check out some of the artistic results of multimedia techniques.

OnLine Design hosts two evenings to showcase what happened when twenty Bay Area artists were given access to a variety of off-the-shelf multimedia hardware and software running on high-end Macs. Howard Vicini organized this extravaganza to see how graphic designers, photographers, and others in related design fields—but without professional video production experience—would adapt to the new technology. He promises that this will be entertaining in nature and not a trade show. The sponsors and providers of the equipment will not be allowed to speak unless they have something fun to say. There'll be video presentations, as well as spontaneous video, light, and sound performances by entertainers using QuickTime, music, dancing, light refreshments, and a no-host bar benefiting a local charity. Best yet—it's free. The two evenings are May 14 and 15, starting at 4:30 pm and running until 2 am. To obtain tickets (no admission without them), call (415)864-0267. Sounds like some great multimedia to me.

The San Francisco Film Festival has an example of interactive cinema running in the 3rd floor lobby of the AMC Kabuki 8 Theaters from 1:30–10:30 pm daily through May 13. According to its director Grahame Weinbren, "In its deliberate investigation of the possibilities of interactive drama, 'Sonata' aspires to lay the foundation for a new cinema, a cinema in which the response of the viewer affects his/her experience, a cinema of moment-by-moment collaboration between viewer and filmmaker. It opens a new dimension for the moving image, aligning the shape of film with the shape of thought, creating a cinema that portrays the world we live in and act on, rather than a world fitted to prior conventions." Now that's a multimedia sentiment! Apparently "Sonata" works by the viewer pointing at a touch-sensitive screen. This causes the main two intertwined narratives—the biblical tale of Judith of Bethulia and Tolstoy's first-person short story 'The Kreutzer Sonata'—to pause and be replaced by a recital of Freud's account of the Wolf Man's dream with the drawing the Wolf Man made to illustrate that dream. Point again and you return to where you were. No doubt when manifested as multimedia, "Sonata" is more involving than mere words convey. ■

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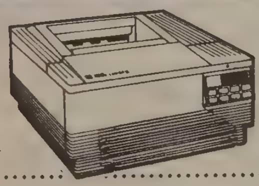

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Under The Hood Of The 3DO Multiplayer

Interview With Rick Tompane, 3DO Vice President Of Technology

BY TONY REVEAUX

A new contender in the consumer entertainment arena is being readied for launch on October 1.

Trip Hawkins' 3DO, a savvy startup supported by Electronic Arts, Time Warner, and Matsushita Electric, has developed a new 32-bit multimedia technology platform that it's licensing to hardware and software manufacturers; it provides a playback and application platform for interactive home entertainment that promises to pack the visual punch of a graphics workstation.

The $700 Multiplayer, from Matsushita's Panasonic, will come with a 300K-per-second CD-ROM drive that can play audio CDs and Kodak Photo CD disks. Like CD-I, CDTV, and VIS, the Multiplayer outputs its display to an NTSC television instead of a computer. Fitted with ports to accept other third-party devices, it's positioned to support a wide range of MIDI, video, and television applications.

> People are excited about our system because it gets away from the clunky polygon-based and wireframe models used in the past.

But what's under the hood of the 3DO Multiplayer that provides all this three-dimensional, real-time, stereo action? We spoke to Rick Tompane, the vice president of technology for 3DO.

WHAT'S DRIVING THIS 3DO ENGINE?

If you take the classical computer architecture and stand it on its head, it might make more sense to you. First of all, it would have a processor; performance of the system is solely a function of how fast you can clock that processor or accelerate its functions, but the CPU ends up being the core of the system. That's not the case in our system. There's not a processor out there fast enough to do the kinds of things that we are doing."

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We've built a dedicated graphics engine that has two parallel processors that will do cel renderings. "Cel" is a reference to the way that animators used to do full-length motion pictures, where they layer celluloid acetate to

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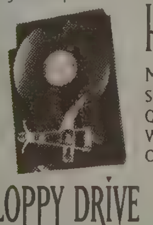

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- 2 serial, 1 parallel, 1 game ports
- 101 enhanced keyboard
- Minitower or minidesktop case
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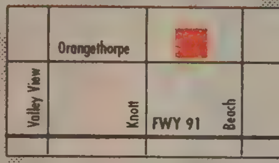

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and up to 32MB	Vesa Local Bus, 3 V.L. slots	$600/$580
486DX-33MHz	ISA	$440/$430
with 128K cache	EISA	$640/$630
and up to 32MB	Vesa Local Bus, 3 V.L. slots	$465/$455
486SX-33MHz	ISA	$345/$335
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486SX-25MHz	ISA	$285/$275
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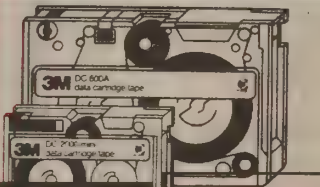

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create backgrounds and foregrounds and characters and objects in the scene.

SO WOULD THE DATA STREAM BE DESCRIBED HERE AS BEING FRAME-BASED RATHER THAN TIME-BASED?

No, it's really intended to be time-based. Good programming is always going to be time-based, but it allows the programmer to focus his energies more on the script and on the elements of style that represent good cinematic productions.

The heart of the system is these two animation engines. Everything in the system is built around supplying those cel animation engines with data to keep them fed—they always want more data to render. They are operating in parallel. Whichever one has the next available cycle, it will then render the next available pixel or cel. Surrounding that is a memory management architecture and 24 DMA [Direct Memory Access] channels that handle the data flow in and out of the engines as well as anywhere else in the system. That's how we get maximum memory bandwidth out of inexpensive video and DRAM [Dynamic Random Access Memory.]

HOW ARE THESE 24 CHANNELS OF DMA MAPPED?

There is a priority structure where different functions of the machine have different levels of priorities. For example, it's unacceptable to have audio be interrupted, because you'll get a loud pop, so audio is very high-priority, whereas you could not necessarily render every frame that you needed to, because it is time-based rather than frame-based.

SO WHAT YOU HAVE HERE IS DEMAND-DRIVEN FLEXIBILITY.

That's true. And one of the beauties of this is that that system offloads almost of all of the traditional graphics rendering functions that programmers have had to kind of push the limits on, writing a lot of very tight assembly code to get any kind of performance out of most traditional systems.

BECAUSE THOSE LINES OF CODE HAVE HAD TO BE DEDICATED.

That's right. So surrounding that have actually been three processors, one of which is a 32-bit RISC [Reduced Instruction Set Computing] processor. That happens to be core based on the ARM architecture, which is a very efficient 32-bit RISC architecture, very cost-effective per MIP of performance that you get. We also have a DSP [Digital Signal Processor] that handles all of the audio functions.

HOW MANY CHANNELS OF STEREO?

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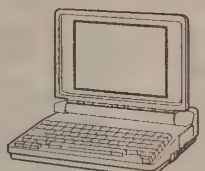

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tracks simultaneously, and we can do a significant amount of 3-D processing within that DSP as well. It allows you to do those 3-D calculations in real time.

For example, you might be doing a simulation game of car racing. You would want to be able to calculate, in real time, the effects of another car coming up behind you and passing you. There is microcode here that will actually calculate the location in 3-D audio space, the doppler shift and phase difference, so that you can get a very realistic audio imaging model in your ears as to the location of a sound. It will also calculate the frequency filtering that your ears are used to hearing; you have to calculate the phase difference that your left and your right ears are going to hear.

That allows the developer to actually attach a sound effect to a particular vehicle or object in space. As it's moving in time, depending upon the input that you are providing, it will actually change the parameters of the sound effect that you hear to place it in 3-D space.

IT'S LOOKING AT IT AS IF IT WERE A SOUND SPRITE.

That's exactly what it is. In addition you can do preprocessing to create those same effects at the tool level. These audio effects and the video effects have not really been available at this price point in the past, not even on very high-end workstations.

When we originally talked to the development community, the overwhelming majority already had Macintosh and Macintosh tools and preferred that as their primary development platform.

But there is no set of 3DO GUI or other working environment. We're the blank page, so to speak.

Tell us more about the video component.

The third processor is essentially a video processor that's in the background, always pulling the data out that is frame-based, to handle all of the issues related to lookup table management, mapping it into the NTSC [TV] frame, and putting it up and doing the encoding on the NTSC side.

THIS, THEN, PROVIDES THE FOUNDATION FOR THE ABILITY OF THIRD-PARTY DEVICES TO ALLOW YOU TO EDIT YOUR HOME VIDEOS ON 3DO?

Yes. The ability to input video would be an optional enhancement from another manufacturer based around the core of the 3DO technology, and would probably be part of a product line of low-end and high-end models, just as in the rest of consumer electronics. People building their own music videos, for example.

WHAT ARE THE DEVELOPERS' TOOLS YOU'VE BEEN PROVIDING?

There's a whole suite of them, what we call Cinematic Software Tools. Not only do you have the traditional programming tools of C compilers, assemblers, symbolic debuggers, linkers, and editors, but there's a number of other tools. They are used to do file conversion, 3-D effects, tapping into the various folios that we have, and to coordinate those with the objects or the images that you have in your library.

There's a number of special effects that are obtainable by the system that have to do with lighting, shading, and transparency, all those kinds of things. We work with a number of third-party tools—things like Adobe Photoshop plug-ins, so that you can export 3DO-style images directly into Photoshop to edit them there.

BUT THE 3DO PLAYER STILL CAN'T INTERFACE DIRECTLY WITH A COMPUTER?

The 3DO player is like a delivery mechanism. The producers are working on a standard Macintosh for all of their development work.

WHY WAS THE MACINTOSH CHOSEN AS THE DEVELOPMENT PLATFORM?

Because by far the majority of the developers already have that capability. We intend to support and extend the set of tools into some of the less popular but still common platforms, everything from Silicon Graphics to IBM-PCs, and other devices like that out there.

When we originally talked to the development community, the overwhelming majority already had Macintosh and Macintosh tools and preferred that as their primary development platform. But there is no set of 3DO GUI or other working environment. We're the blank page, so to speak.

HOW WILL THESE DEVELOPMENT TOOLS BE PACKAGED—LIKE STANDARD MACINTOSH SOFTWARE?

ROM disks that include all the code you need to begin developing for the 3DO system. We have a whole content library of hundreds of Mac-format CD-ROMs—still images, video clips, sound effects. We have gone out and acquired lots and lots of these things to help kick-start the business—one of the things we heard early on from many of our developers was the frustration they had in terms of being able to go get content and use it. This way, they can use it without restriction, as long as it's for a 3DO title. We've bought those rights for them already. We're a service company to the development community.

HOW DO YOU GET CONTENT THAT HAS BEEN AUTHORED ON THE MAC OVER TO THE 3DO MACHINE?

There's a box that they get that has a fiber-optic link to a card in the Macintosh as part of a hardware/software package. They can do all the content assembly and programming on the system; then they can download it into the target machine for full emulation and debug and all those kinds of things. The software development kit is about $29.95, and the hardware development kit is about $49.95. It's very low cost. In addition, we provide any upgrades that are neccesary.

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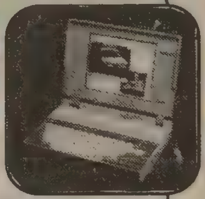

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ing our technology to make that happen, but that's still premature; right now we're focusing on getting the consumer product down and developing the standard. But there's nothing technically to restrict us from letting that happen.

> There is a priority structure where different functions of the machine have different levels of priorities. For example, it's unacceptable to have audio be interrupted, because you'll get a loud pop, so audio is very high priority.

ONE OF THE THIRD-PARTY ADD-ONS THAT HAS BEEN MENTIONED IS AN MPEG CARTRIDGE TO PLUG INTO THE PLAYER. WHAT WOULD THAT BE USED FOR?

When somebody wants to release music videos and movies on CD-ROMs, the player would then be able to take advantage of the MPEG standard, and be able to play those on the system. It's part of the Multiplayer concept, the fact that we support standard audio CDs, Kodak Photo CDs, interactive disks, and support movie disks as well. It's a cartridge now because the MPEG standard has not been completely stabilized; as soon as that happens, obviously we could support that."

Future generations of players might have that built into the firmware?

Exactly.

WHAT KIND OF INTERFACE DOES THE PLAYER HAVE, TO DEAL WITH THE VARIETY OF INPUT DEVICES COMING IN FROM THE CONSUMER ELECTRONICS SIDE?

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velop a standard interface so that the application developer doesn't have to need to know what it is. A standard controller will work whether it comes from Panasonic or AT&T or anywhere else. Similarly a modem or a keyboard or a mouse or a trackball or 3-D goggles would work universally.

So, for example, if they get a character call from a keyboard, whatever kind of keyboard or generic input mechanism there is, they will be able to do it, independent of what type it is.

LOOKING AHEAD—WAY AHEAD—HOW MIGHT YOU SEE 3DO SUPPORTING VIRTUAL REALITY IN THE HOME?

First of all we think that is a little bit further off; it's not something that people are screaming for.

I think that there's a lot of people who are interested in that, and once developers figure out how to bring those kinds of entertainment applications to the home, there will be even more interest.

Everything in the system is built around supplying those cel animation engines with data to keep them fed.

The nice thing is that the people that we have talked to, doing those kinds of applications, are really excited about our system because the 3DO system is the first one that they've seen that has the kind of power and flexibility needed to get away from the clunky polygon-based and wireframe models that people have been using in the past.

We do think that there will be third parties in particular who will provide those kinds of software and peripheral products that would enable that to happen. It wouldn't surprise me at all to see someone develop a head-mounted tracking display viewer that operated in full 3-D, and had the ability to link that to other systems out on a network and a player in the home, and be able to have those experiences. It would have to be a hardware and software solution, but certainly our system would support that.

[This just in at press time, from MacWEEK: *"Macromedia has announced that three of its products, MacroMind Director, MacroModel and Three-D, will be bundled free with The 3DO Company's Authoring Toolkit for 3DO developers. 3DO licensed Director's file format, enabling users of the forthcoming 3DO Interactive Multiplayer to play back Mac Director files."]* ■

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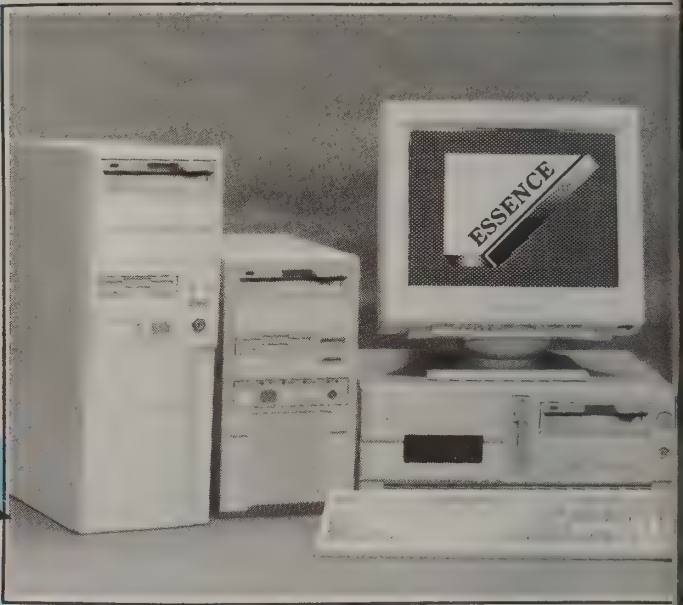

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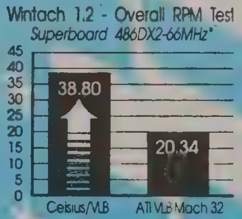

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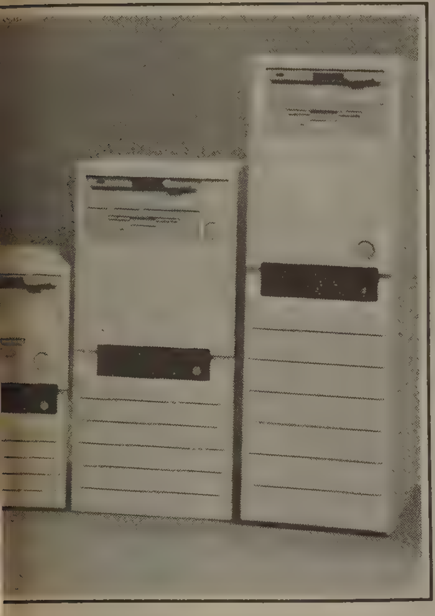

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- * 486DLC M/B
- * Cyrix 486DLC Microprocessor
- * Math Coprocessor included
- * 128K High Speed Cache
- * 4MB Memory on board
- * TEAC 1.2M & 1.44M FDD
- * IDE FDD & HDD Controller
- * 2 Serial / 1 Parallel / 1 Game
- * Mini-Vertical Case
- * 230 Watts Power Supply
- * Enhanced 101 Keys Keyboard

Upgrade Options

For ISA Systems:

14" Infiniti IN8339SV Super VGA Monitor (.39dp) w/AVGA-3 1MB VGA Card	$280
14" Infiniti IN8828SV Super VGA Monitor (.28dp) w/AVGA-3 1MB VGA Card	$310
14" Infiniti IN8828N4 Non-Interlaced Monitor (.28dp) w/AVGA-3 1MB VGA Card	$355
14" AcerView 11 VGA Color Monitor (.39dp) w/16-bit VGA-1 Card (256K)	$245
14" AcerView 33D Super VGA Color Monitor (.28dp) w/AVGA-3 1MB VGA Card	$330
14" AcerView 34T Non-Interlaced Color Monitor (.28dp) w/AVGA-3 1MB VGA Card	$360
15" AcerView 56L Digital Auto-Tracking Flat-Screen Monitor w/Orchid Fahrenheit 1MB Graphics Accelerator	$640
14" CTX-5468A Super VGA Monitor (.28dp) w/AVGA-3 1MB VGA Card	$320
14" CTX-5468NI Non-Interlaced Color Monitor (.28dp) w/AVGA-3 1MB VGA Card	$345
14" CTX-1461 Digital Auto-Tracking Monitor (.28dp) w/AVGA-3 1MB VGA Card	$370
15" CTX-1560 Digital Auto-Tracking Monitor (.28dp) w/Orchid Fahrenheit 1MB Graphics Accelerator	$590
17" CTX-1760 Digital Auto-Tracking Monitor (.28dp) w/Orchid Fahrenheit 1MB Graphics Accelerator	$955
14" ViewSonic 6E Non-Interlaced Color Monitor (.28dp) w/AVGA-3 1MB VGA Card	$375
14" ViewSonic 5E Non-Interlaced Color Monitor (.28dp) w/AVGA-3 1MB VGA Card	$440
15" ViewSonic 6FS Digital Auto-Tracking Flat-Screen Monitor w/Orchid Fahrenheit 1MB Graphics Accelerator	$685
17" ViewSonic 7 Digital Auto-Tracking Monitor (.28dp) w/Orchid Fahrenheit 1MB Graphics Accelerator	$1055

Hard Disk Subsystem & Other Options (w/Systems):

40MB IDE HDD	$135
80MB IDE HDD	$180
120MB IDE HDD	$210
170MB IDE HDD	$235
200MB IDE HDD	$260
240MB IDE HDD	$290
340MB IDE HDD	$380
520MB IDE HDD	$795
Tekram DC-600 IDE Caching Controller w/2MB	$200
MicroSoft DOS 6.0	$45
MicroSoft Windows 3.1 w/Mouse	$58
Internal 2400 Buad Data Modem	$30
Internal 9600/2400 Baud Fax Modem	$55
Internal 14400/14400 Baud Fax Modem	$185
Mitsumi CRMC Intrernal CD-ROM	$196
Sony CDU-31A Internal CD-ROM	$236
Sound Blaster Pro	$135
Media-Vision Pro Audio Spectrum 16 Sound Card	$175
Orchid Sound Producer Pro w/Speaker & Mic	$145
Power Center (UL)	$16
Mitac Multimedia Starter Kit	$390

-Mitsumi CRMC Internal CD-ROM (350ms)
-Sound Blaster Pro compatible sound card
-5 CD Titles: Compton's Multimedia Encyclopedia for Windows, The KGB/CIA World Fact Book, Dictionary of the Living World, Grammy Awards, & CD-ROM Software Jukebox
-and a pair of speakers

For EISA & Local Bus Systems:

ViewSonic 6E 14" Non-Interlaced Monitor	$322
ViewSonic 5E 14" Non-Interlaced Monitor	$385
ViewSonic 6FS 15" Digital Non-Interlaced Monitor	$525
ViewSonic 7 17" Digital Multi-Frequency Monitor	$898
ViewSonic 8 20" Digital Multi-Frequency Monitor	$1560
AcerView 34T 14" Non-Interlaced Monitor	$305
AcerView 56L 15" Digital Non-Interlaced Monitor	$480
AcerView 76i 17" Digital Non-Interlaced Monitor	$885
CTX-1461 14" Non-Interlaced Monitor	$315
CTX-1560 15" Digital Non-Interlaced Monitor	$430
CTX-1760 17" Digital Non-Interlaced Monitor	$795
MAG 1564 15" Digital Non-Interlaced Monitor	$465
MAG 15H 15" Digital Non-Interlaced Monitor	$550
MAG 17H 17" Digital Non-Interlaced Monitor	$985
Optiquest 1500D 14" Digital Non-Interlaced Monitor	$368
Optiquest 2000DX 15" Digital NI Monitor	$458
Optiquest 4000DX 17" Digital NI Monitor	$680

Memory Upgrade:

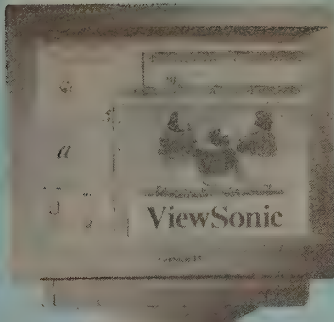
4MB (386SX) from 2MB	$80
8MB (486DX/SX, 386DX) from 4MB	$160
16MB (486DX/SX, 386DX) from 8MB	$460

Tape Backup:

Hi-Lite (Archive) 250MB Tape Backup	$185
Colorado DJ-10 120MB Tape Backup	$155
Colorado DJ-20 250MB Tape Backup	$205
Colorado JT-10 120MB Parallel Tape Backup	$350
Colorado JT-20 250MB Parallel Tape Backup	$415

For more parts see listings on next page

l Support: 714/546-7902



ViewSonic 15

The award-winning family of ViewSonic monitors now includes the **New Generation** ViewSonic 15. It features **ViewMatch** color control along with exceptional clarity and brilliance. And, with the ultra high **76Hz refresh rate at 1024x768**, the multifrequency monitor provides the user with a complete flicker free image.

With its larger flat square screen, the monitor offers a beautiful display with a full edge-to-edge crisp, glare-free image. The new ergonomically designed drop-down control panel makes it extremely easy to adjust size, position, color and pin-cushioning.

In keeping with today's concern for a safer environment, the ViewSonic 15 meets strict Swedish MPR-II low radiation standards. And, for home use, it is FCC Class B approved.

$625

Star Moon Star WILD Multi-Media Upgrade Kit

Upgrade Kit included:

SONY CDU-31A CD-ROM

- The lastest CD-ROM from SONY, 680MB capacity, 64KB buffer size, 150KB data transfer rate, 490ms access speed, built-in caddy for ease of use

Sun Moon Star Stereo Sound Board

- MPC, Ad Lib, and Sound Blaster Pro Basic compatible
- Stereo Digital/Analog mixer for stereo audio sources: DAC, FM, microphone, line-in and CD
- Sampling with 8-bit stereo DACs and ADCs selectable sampling rates: 4 - 44.1 KHz
- 20-voice, 4-operator OLP3 FM synthesier
- Built-in MIDI interface for music and sound creation
- Standard PC joystick port
- Microphone Automatic Gain Control (AGC) amplifier
- Output power amplifier with volume control
- Built-in interfacefor SONY CDU-31A

Bundled Multimedia CD titles including:

- Multimedia Encyclopedia '92
- World Atlas
- U.S. Altas
- Chessmaster 3000
- Mavis Beacon Teaches Typing V.20

$415

Mitsumi CD-ROM Model: CRMC

- MPC compliant
- 630MB Capacity
- 350ms access time
- 175KB data transfer rate
- comes with 16-bit interface cards & cable

$199

Multimedia Madness

MULTIMEDIA SYSTEMS

Sun Moon Star Multimedia Upgrade Kit $415.00
- SONY CDU-31A Internal CD-ROM Drive - 490ms
- Sun Moon Star stereo sound board with sound utilities and bulti-in CDU-31A interface, Sound blaster Pro Basic compatible
- 5 leading multimedia CD titles - Multimedia Encyclopedia '92, World Atlas, U.S. Atlas, Chessmaster 3000 and Beacon's Typing Program
- A pair of Mini Speakers

Mitac Multimedia Upgrade Kit $395.00
- Mitsumi Internal CRMC CD-ROM (350ms, Kodak Photo CD compatible)
- Sound Galaxy NX Pro Sound Card
- Shielded Stereo Computer Speakers
- Software bundled: Compton's Multimedia Encyclopedia for Windows, The KGB/CIA World Factbook, Dictionary of the Living World, Grammy Awards, CD-ROM Software Jukebox

Creative Labs Discovery CD 8 Upgrade Kit (Int.) $405.00
- **Sound Blaster Pro** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pair of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The Animals!, Lemmings

Creative Labs Discovery CD 16 Upgrade Kit (Int.) $465.00
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: Multimedia Encyclopedia, The Animals!, Lemmings

Creative Labs Eduaterment CD 8 Upgrade Kit (Int.) . $465.00
- **Sound Blaster Pro** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: The San Diego Zoo Presents ... The Animals!, Where in the World is Carmen Diego?, Multimedia Enclopedia, Just Grandma and Me, The Secret of Monkey Island, Loom, Secret Weapons of the Luftwaffe, Sherlock Holmes - Consulting Detective

Creative Labs Eduaterment CD 16 Upgrade Kit (Int.) $525.00
- **Sound Blaster 16** Stereo Sound Card
- Creative Labs Internal CD-ROM (Panasonics CD-ROM), 64KB Buffer, 150KB/sec Data Transfer, 390ms Access rate, Photo CD compatible
- A pairs of Stereo Speakers
- Software bundled: The San Diego Zoo Presents ... The Animals!, Where in the World is Carmen Diego?, Multimedia Enclopedia, Just Grandma and Me, The Secret of Monkey Island, Loom, Secret Weapons of the Luftwaffe, Sherlock Holmes - Consulting Detective

Media Vision Fusion CD 16 (Internal) $495.00
- SONY CDU-31A Internal CD-ROM Drive - 490ms
- Media Vision Pro Audio 16 Stereo Sound Card
- High-quality Labtec Amplified Speaker System
- Software bundled: Carmen San Diego, Compton's New Media, Wing Commander II, Ultima Underworld

Media Vision Pro-16 Multimedia System $895.00
- NEC CDR-84 Internal SCSI CD-ROM (Multi-Session, 280ms)
- Media Vision Pro Audio Spectrum 16 Stereo Sound Card
- Software bundled: Carmen San Diego, Compton's Encyclopedia, Lotus 1-2-3, King's Quest V, Nautilus CD, and MacroMind Action! CD

SOUND CARDS & CD-ROMS

Mitsumi CRMC Internal CD-ROM w/Interface	$198.00
NEC CDR-74-1 External SCSI CD-ROM (280ms)	$625.00
NEC CDR-84-1 Internal SCSI CD-ROM (280ms)	$550.00
Panasonic CR-522-B Internal CD-ROM w/Interface	$235.00
SONY CDU-31A Internal CD-ROM w/Interface	$235.00
SONY CDU-541 Internal SCSI CD-ROM	$440.00
Toshiba 3401B Internal SCSI CD-ROM	$450.00
Toshiba 3401B Internal SCSI CD-ROM w/Interface - Fully integrated Audio, Double-speed, MPC compliant, Multi-Session Kodak Photo CD compliant, SCSI-2	$495.00
Creative Lab Sound Blaster Deluxe	$85.00
Creative Lab Sound Blaster Pro Deluxe	$138.00
Creative Lab Sound Blaster 16 ASP	$240.00
Creative Lab Video Blaster w/Microsoft video for Win	$355.00
Media Vision Pro Audio Spectrum 16 Sound Card	$180.00
Media Vision Pro Audio Studio 16 Sound Card	$240.00
Orchid Sound Producer Pro w/Mic & Speaker	$149.00
Sound Blaster Pro w/SONY-31A CD-ROM Interface	$120.00
Sound Commander Pro CD Bundle Package - w/SONY-31A CD-ROM Interface & Speakers - Bundled SW: CD Studio, Karaoke Software, PC Organ, Windows Driver & Audio Mixer	$135.00
Sun Moon Star Multimedia Sound Set - w/Sound Blaster Pro Sound Card w/SONY-31A CD-ROM Interface - Bundled Software: Mario is Missing, & D/Generation	

SPEAKERS & ACCESSORY

Labtec AM-22 Deluxe Microphone	$13.95
Labtec C-10 Computer Stereo Headphone	$14.95
Labtec CS-150 Shielded Amplified Stereo Speakers	$19.50
Labtec CS-550 Shielded Amplified Stereo Speakers - w/Built-in Power Boosters	$27.50
Labtec SS-700 Shielded Amplified Stereo Speakers - w/3 band EQ	$32.50
Labtec AD-4 400mA AC Adapter (for Speakers System)	$9.95

CD TITLES

CD Pak for DOS - 6 Titles: Multimedia Encyclopedia, The Animals!, Reference Library, US Atlas, World Altas, & The Secret of Monkey Island	$95.00
CD Pak for Windows - 6 Titles: Multimedia Encyclopedia, The Animals!, Chessmaster 3000, US Atlas, World Atlas, & Beacon Teaches Typing 2.0	$95.00
CD Pak for Home - 5 Titles: Tempra Access Photo CD, The Animals!, US Atals, World Atlas, & Mayo Clinic	$75.00
CD Pak for Entertainment - 5 Titles: Mario is Missing, D/Generation, Chessmaster 3000, Wind Commander / Ultima VI, & The Secret of Monkey Island	$75.00
Microsoft BookShelf (MPC)	$60.00
Microsoft Works (MPC)	$55.00
Lotus 1-2-3 V3.1 (MPC)	$108.00
Compton's Encyclopedia (MPC)	$63.00
Toolworks Multimedia Encyclopedia (MPC)	$53.00
Toolworks Reference Library (DOS)	$26.00
Playing Language - English (DOS)	$31.00
Playing Language - French (DOS)	$31.00
Playing Language - Germany (DOS)	$31.00
Playing Language - Japanese (DOS)	$31.00
Playing Language - Spanish (DOS)	$31.00
Family Choice / Britannica (DOS)	$30.00
Family Doctor (DOS/MAC)	$30.00
Family Education Collections (DOS)	$29.00
Mayo Clinic Family Health Book (DOS)	$24.00
Atlas Pak - US / World Atlas (DOS)	$23.00
U.S. Atlas with Automap (DOS)	$29.00
U.S. Histroy (DOS)	$28.00
TIME Almanac (DOS)	$27.00
Time Table of History (DOS)	$21.00

CD TITLES

The Animals! (MPC)	$24.00
The Secret of Monkey Island (DOS)	$24.00
Wing Commader / Ultima VI (DOS)	$26.00
American Bus Phone Book - 1992 (DOS)	$27.00
Hot Stuff 2 (MPC/DOS)	$25.00
TEMPRA Access Photo CD Imaging Software (DOS)	$27.00
Publish It 2.0 (DOS)	$31.00
Arthur's Teacher Trouble (MPC)	$32.00
Bring the World to Your Senses (DOS)	$20.00
Composer Quest (PMC)	$37.00
Dictionary of the Living World (MPC)	$34.00
Great Cities - Vol. 1 (DOS)	$28.00
Great Cities - Vol. 2 (DOS)	$28.00
MacMillan Dictionary for Children (MPC)	$41.00
National Geographic Mammals (DOS)	$31.00
Presidents, It started with George (DOS)	$93.00
Wild Places (DOS)	$20.00
CIA World Fact Book (DOS)	$30.00
Guinness Disc of Records (DOS)	$20.00
MIDI Music Shop (MPC)	$29.00
Mixed up Mother Goose (MPC)	$29.00
PC-SIG 9th Edition (DOS)	$24.00
PC-SIG 11th Edition (DOS)	$32.00
Space Quest IV	$32.00
Business & Economy Atals (DOS)	$32.00
Carmen San Diego (DOS)	$31.00
Guniness Disk of Record (MPC)	$31.00
Jones in Fast Lanes (MPC)	$26.00
King's Quest V (DOS)	$26.00
Library of Future 1st (DOS)	$58.00
Loom From Lucas Film (DOS)	$26.00
Marketing Master 1992 (DOS)	$29.00
Mavis Teaches Typing (MPC)	$29.00
Media Clips - 4 PK (MPC)	$53.00
Secret Weapons / Luftwaffe (DOS)	$26.00
Stellar 7 (DOS)	$26.00
Total Baseball (DOS)	$45.00
Wing Command & Secret Mission	$37.00
Amanda Stories (MPC)	$55.00
World View (DOS)	$20.00
Annabel's Dreams (MPC)	$80.00
Audubon Mammals (DOS)	$62.00
Ocean Digital Imagery V1 (DOS)	$41.00
Presidents (DOS)	$30.00
So Much Sharewaew I (DOS)	$20.00
So Much Shareware II (DOS)	$26.00
Corp Snapshot (DOS)	$39.00
Desert Storm (MPC)	$30.00
Electronic Library of Art VI (DOS)	$38.00
Grips 2 (DOS)	$33.00
USA Wars: Civil War (DOS)	$48.00
USA Wars: Korea	$48.00
USA Wars: World Wae II (DOS)	$48.00
USA Wars: Vietnam (DOS)	$48.00
Vital Signs (MPC)	$98.00
WinWare Vol 3	$27.00
Beauty & Beast (MPC)	$24.00
Peter & Wolf (MPC)	$24.00
Holy Bible	$36.00
Illustrated Works of Shakespeare	$36.00
Sound Library (MPC)	$22.00
Collection of PC Graphics (DOS)	$24.00
Sport's Best (3 in 1) (DOS)	$27.00
CD Game Pak II (DOS)	$32.00
Battle Chess (DOS)	$28.00
DTP Pro FM - Wave Clipart	$27.00
Jets & Props (MPC)	$29.00
Microprose Game Pak Collection	$33.00

ESSENCE GROUP

17815 Newhope Street, Suite G, Fountain Valley, CA 92708
Order Hot Line: 1-714-546-3110 ◇ Technical Support: 1-714-546-7902 ◇ Fax Order Line: 1-714-546-3803

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SYSTEM BOARDS (0K)

VESA Local Bus System Boards (w/CPU)

Orchid 486DX2-66MHz VESA Local Bus M/B w/256K Cache	$806.00
Orchid 486DX-50MHz VESA Local Bus M/B w/256K Cache	$722.00
Orchid 486DX-33MHz VESA Local Bus M/B w/256K Cache	$575.00
AIR Baby 486DX2-66MHz VESA Local Bus M/B w/256K Cache	$771.00
AIR Baby 486DX-50MHz VESA Local Bus M/B w/256K Cache	$697.00
AIR Baby 486DX-33MHz VESA Local Bus M/B w/256K Cache	$555.00
VEGA Baby 486DX2-66MHz VESA Local Bus M/B w/256K Cache	$741.00
VEGA Baby 486DX-50MHz VESA Local Bus M/B w/256K Cache	$667.00
VEGA Baby 486DX-33MHz VESA Local Bus M/B w/256K Cache	$525.00
EFAR Baby 486DX2-66MHz VESA Local Bus M/B w/256K Cache	$691.00
EFAR Baby 486DX-33MHz VESA Local Bus M/B w/256K Cache	$470.00
OPTI Mini 486DX2-66MHz VESA Local Bus M/B w/256K Cache	$694.00
OPTI Mini 486DX-50MHz VESA Local Bus M/B w/256K Cache	$620.00
OPTI Mini 486DX-33MHz VESA Local Bus M/B w/256K Cache	$473.00
Hint Baby 486DX2-66MHz EISA VESA Local Bus M/B w/256K Cache	$756.00
Hint Baby 486DX-33MHz EISA VESA Local Bus M/B w/256K Cache	$535.00

VESA Local Bus Video Cards & Controllers:

ATi VLB mach 32 VESA Local Bus Graphics Accelerator w/2MB	$395.00
Cirrus Logic GD5426 1MB VESA Local Bus Graphics Accelerator	$110.00
Diamond SpeedStar Pro VESA Local Bus Graphics Accelerator w/1MB	$155.00
Diamond Stealth-24 VESA Local Bus Graphics Accelerator w/1MB	$185.00
Diamond Stealth Pro VESA Local Bus Graphics Accelerator w/1MB	$275.00
Diamond Viper VESA Local Bus Graphics Accelerator w/2MB VRAM	$395.00
Genoa 1MB VESA Local Bus Graphics Accelerator	$125.00
Oak 087 1MB VESA Local Bus Graphics Accelerator	$110.00
Orchid Fahrenheit VESA Local Bus Windows Accelerator w/1MB	$185.00
Orchid Celius VESA Local Bus Graphics Accelerator w/2MB	$275.00
Orchid P9000 VESA Local Bus Graphics Accelerator w/3MB	$395.00
Orchid IO440-0 VESA Local Bus IDE Controller w/Multi I/o	$68.00
Turbo VESA Local Bus IDE Controller w/Multi I/O	$75.00
VESA Local Bus IDE Controller with Multi I/O	$50.00
Tekram DC-680 VESA Local Bus IDE Caching Controller (up to 16MB)	$185.00
UltraStor 34F VESA Local Bus SCSI Controller (Bus Master)	$280.00

EISA Bus & EISA Local Bus System Boards (w/CPU)

AIR Baby 486DX2-66MHz EISA M/B w/256K Cache (USA made)	$961.00
AIR Baby 486DX-50MHz EISA M/B w/256K Cache (USA made)	$887.00
AIR Baby 486DX-33MHz EISA M/B w/256K Cache (USA made)	$745.00
VEGA Baby 486DX2-66MHz EISA M/B w/256K Cache (USA made)	$906.00
VEGA Baby 486DX-50MHz EISA M/B w/256K Cache (USA made)	$832.00
VEGA Baby 486DX-33MHz EISA M/B w/256K Cache (USA made)	$690.00
OPTI Baby 486DX2-66MHz EISA Local Bus M/B w/256K Cache	$786.00
OPTI Baby 486DX-50MHz EISA Local Bus M/B w/256K Cache	$722.00
OPTI Baby 486DX-33MHz EISA Local Bus M/B w/256K Cache	$570.00

ISA Bus System Boards (w/CPU)

VEGA Baby (3)486DX2-66MHz M/B w/256K Cache (USA made)	$731.00
VEGA Baby (3)486DX-50MHz M/B w/256K Cache (USA made)	$652.00
VEGA Baby (3)486DX2-50MHz M/B w/64K Cache (USA made)	$590.00
VEGA Baby (3)486DX-33MHz M/B w/64K Cache (USA made)	$480.00
VEGA Baby (3)486SX-25MHz M/B w/64K Cache (USA made)	$290.00
VEGA Baby 3(4)86DX-40MHz M/B w/64K Cache (USA made)	$223.00
OPTI Mini 486DX2-66MHz M/B w/256K Cache (Write-back cache)	$679.00
OPTI Mini 486DX-50MHz M/B w/256K Cache (Write-back cache)	$600.00
OPTI Mini 486DX2-50MHz M/B w/128K Cache (Write-back cache)	$541.00
OPTI Mini 486DX-33MHz M/B w/128K Cache (Write-back cache)	$431.00
OPTI Mini 486SX-25MHz M/B w/128K Cache (Write-back cache)	$241.00
EFAR Baby (3)486DX2-66MHz M/B w/256K Cache	$671.00
EFAR Baby (3)486DX-50MHz M/B w/256K Cache	$592.00
EFAR Baby (3)486DX2-50MHz M/B w/64K Cache	$542.00
EFAR Baby (3)486DX-33MHz M/B w/64K Cache	$432.00
EFAR Baby (3)486SX-25MHz M/B w/64K Cache	$242.00
EFAR Baby 3(4)86DX-40MHz M/B w/64K Cache	$175.00
Symphony Mini 486DX2-66MHz M/B w/256K Cache	$691.00
Symphony Mini 486DX-50MHz M/B w/256K Cache	$617.00
Symphony Mini 486DX2-50MHz M/B w/64K Cache	$550.00
Symphony Mini 486DX-33MHz M/B w/64K Cache	$440.00
Symphony Mini 486SX-25MHz M/B w/64K Cache	$250.00
OPTI Mini 486DLC-40MHz M/B w/128K Cache (w/Math Co)	$336.00
OPTI Mini 486DLC-33MHz M/B w/128K Cache (w/Math Co)	$271.00
OPTI Mini 386DX-40MHz M/B w/128K Cache (Write-back cache)	$167.00
UMC Mini 386DX-40MHz M/B w/128K Cache (Write-back cache)	$170.00
OPTI Mini 386DX-33MHz M/B w/128K Cache (AMD CPU)	$179.00
UMC Mini 386DX-33MHz M/B w/128K Cache (AMD CPU)	$181.00
**** 256K Cache upgrade from 64K for all 486 and 386 M/B*	*$45.00*
**** 256K Cache upgrade from 128K for all 486 and 386 M/B*	*$30.00*
OPTI Mini 386SX-40MHz MB w/16K Cache	$135.00
MX Mini 386SX-40MHz M/B	$119.00
OPTI Mini 386SX-33MHz M/B	$127.00
ALI Mini 386SX-33MHz M/B	$109.00
PC Mini 386SX-33MHz M/B	$99.00

ADD-ON BOARDS

Mono/Graphics/Printer Card	$15.00
AVGA-1 VGA Card w/256K	$27.00
AVGA-3 (Cirrus Logic GD5420) 1MB Graphics Accelerator (32K color)	$55.00
TVGA-9000 VGA Card w/256K (Trident 9000 Chipset,upto 512K)	$33.00
TVGA-8900CL 1MB SuperVGA Card (2x faster than Trident 8900C)	$58.00
PVGA-1C VGA Card w/256K (WD90C11 Chipset,upto 512K)	$49.00
PVGA-1DW Graphics Accelerator w/1MB & Hi-Color Chip	$110.00
ATi Graphics Ultra Plus (1280x1024, 2MB Dram)	$315.00
ATi Graphics Ultra Pro (1280x1024 Non-Interlaced, 2MB VRam)	$405.00
ATi Graphics Ultra Pro EISA w/2MB VRAM	$565.00
Diamond SpeedStar-24X 1MB VGA Card (16Million colors)	$160.00
Diamond SpeedStar Pro Graphics Accelerator w/1MB	$155.00
Diamond Stealth-24 1MB Windows Accelerator (16Million colors)	$165.00
Diamond Stealth Pro Graphics Accelerator w/1MB VRAM	$270.00
Orchid Pro-Designer IIs 1MB VGA Card w/Sierra RAMDAC	$145.00
Orchid Pro-Designer IIs-E 1MB EISA VGA Card w/Sierra RAMDAC	$165.00
Orchid Fahrenheit Windows Accelerator (24-bit, 16.7Mil colors) w/1MB	$170.00
Orchid Fahrenheit-VA Windows Accelerator with Voice Annotation w/1MB - 24bit, 16.7Million colors, 1280x1024, Audio capabilities	$209.00
AT I/O (2 Serial 1 Parallel 1 Game) Card	$14.00
High Speed AT I/O (2 Serial 1 Parallel) - compatiable 16C550	$40.00
Parallel (Printer) Card	$10.00
AT IDE Adapter (Dual floppy & hard disk) w/Cable	$15.00
AT Super IDE IO Adapter (Dual floppy & hard disk, 2S, 1P, 1G)	$18.00
GSI-11V 2.88M Four (4) Floppy Controller & Cable	$52.00
GSI-18V Co-resident IDE Controller (Works with ST412,ESDI,SCSI)	$42.00
GSI-21V 2.88M Four (4) Floppy & Intelligent IDE Adapter w/Cable	$62.00
Promise IDE Caching Controller (512K,upto 8.5MB,2FD/2HD)	$125.00
Tekram DC-600B ISA IDE Caching Controller (up to 16MB)	$130.00
Tekram DC-680 VESA Local Bus IDE Caching Controller (up to 16MB)	$185.00
DTC-2290 EISA IDE Floppy/Hard Disk Contorller	$125.00
DTC-3290 EISA SCSI Caching FD/HD Controller (0K,upto 4MB)	$435.00
DTC-3292 EISA SCSI FD/HD Controller	$325.00
UltraStor 14F SCSI FD/HD Controller	$210.00
UltraStor 24F EISA SCSI FD/HD Controller	$360.00
UltraStor 34F VESA Local Bus SCSI FD/HD Controller	$280.00
Future Domain 1670 16-bit SCSI Floppy/Hard Disk Adapter Kit	$158.00
Always IN-2000 16-bit SCSI Host Adapter (Novell Certified)	$189.00
ADAPTEC AHA-1522BK SCSI Adapter Kit	$158.00
ADAPTEC AHA-1542BK SCSI Bus Master Host Adapter Kit	$240.00
ADAPTEC AHA-1542CK SCSI Bus Master Host Adapter Kit	$260.00
ADAPTEC AHA-1542CK-Plus SCSI Bus Master Host Adapter Kit	$325.00
ADAPTEC AHA-1742AK EISA SCSI Bus Master Adapter Kit	$410.00

MONITORS

Tatung MM-14SAE 14" MonoVGA Monitor (1024x768)	$129.00
AcerView 11 14" VGA Monitor (640x480,.39dp)	$218.00
AcerView 33D 14" SuperVGA Color Monitor (1024x768,.28dp)	$275.00
AcerView 34T 14" Non-Interlaced Monitor (1024x768,.28dp)	$305.00
AcerView 35 14" SuperVGA Monitor (1024x768,.26dp)	$450.00
AcerView 56L 15" Digital Multi-Frequency Color Monitor (.28dp)	$480.00
AcerView 76i 17" Digital Multi-Frequency Color Monitor (.28dp0	$885.00
CTX5439A 14" SuperVGA Color Monitor (1024x768,.39dp)	$228.00
CTX5468A 14" SuperVGA (TriScan) Color Monitor (1024x768,.28dp)	$265.00
CTX5468NI 14" Non-Interlaced Color Monitor (1024x768,.28dp)	$290.00
CTX1461 14" Non-Interlaced Color Monitor (1024x768, 72Hz refresh)	$315.00
CTX1560 15" Digital Non-Interlaced Color Monitor (1024x768,.28dp)	$430.00
CTX1760 17" Digital Flat-Screen Color Monitor (1280x1024,.28dp)	$795.00
Infiniti IN8339SV 14" SuperVGA Color Monitor (1024x768,.39dp)	$225.00
Infiniti IN8828SV 14" SuperVGA Color Monitor (1024x768,.28dp)	$258.00
Infiniti IN8828N4 14" Non-Interlaced Color Monitor (1280x1024,.28dp)	$300.00
MAG 1564 15" Color Monitor (1280x1024,.28dp)	$465.00
MAG MX-15H 15" Color Monitor (1280x1024,.28dp)	$550.00
MAG MX-17H 17" Color Monitor (1280x1024,.28dp)	$985.00
NEC MultiSync 3FGx 15" Color Monitor (1024x768,.28dp)	$570.00
NEC 3FGe 15" Multi-Frequency Color Monitor (1024x768,.28dp)	$625.00
NEC 4FGe 15" Multi-Frequency Color Monitor (1024x768,.28dp0	$740.00
NEC 5FGe 17" Multi-Freuqency Color Monitor (1024x768,.28dp0	$1125.00
NEC MultiSync 6FG 21" Color Monitor (1280x1024,.28dp)	$2350.00
Optiquest 800S 14" VGA Color Monitor (640x480,.39dp)	$225.00
Optiquest 900S 14" SuperVGA Color Monitor (1024x768,.28dp)	$280.00
Optiquest 1000S 14" Non-Interlaced Color Monitor (1024x768,.28dp)	$310.00
Optiquest 1500D 14" Digital Non-Interlaced Monitor (1024x768,.28dp)	$368.00
Optiquest 2000DX 15" Digital Multi-Freq Monitor (1280x1024,.28dp)	$458.00
Optiquest 4000DX 17" Digital Multi-Freq Color Monitor (1024x768,.31dp)	$680.00
Optiquest 4000D 17' Digital Multi-Freq Color Monitor (1280x1024,.28dp)	$865.00
Sony CPD-1320 14" Non-Interlaced Monitor (640x480,.25dp)	$385.00
Sony CPD-1430 14" MultiScan Monitor (Non-Interlaced,.25dp)	$590.00
Sony CPD-1730 17" MultiScan Monitor (Non-Interlaced,.25dp)	$1045.00
Sony CPD-2036S 20" MultiScan Monitor (non-Interlaced,.30dp)	$1995.00
ViewSonic 4E 14" SuperVGA Color Monitor (1024x768,.28dp)	$295.00
ViewSonic 6 14" Non-Interlaced Color Monitor (1024x768,.28dp)	$340.00
ViewSonic 6E 14" Non-Interlaced Color Monitor (1024x768,.28dp)	$322.00
Viewsonic 5E 14" Non-Interlaced Color Monitor (1024x768,72Hz refresh)	$385.00
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Conner CP-30540 545MB Fast SCSI-2 HDD (12ms,256K cache buffer)	$860.00
Conner CP-385A SFT*STOR 85MB IDE Package	$250.00
Conner CP-3170A SFT*STOR 170MB IDE Package	$325.00

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Panasonic KX-P2123 Quiet Printer (24pin/240cps/80col/color option)	$239.00
Panasonic KX-P2124 Quiet Printer (24pin/320cps/80col/color option)	$318.00
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The first weeks may be difficult, because unanticipated problems will usually rise to the surface and demand immediate solutions. People may find they haven't been adequately trained, they need more coaching, or there are difficulties in remaining part of their work group when they're not actually in the office. There may be technical problems, too.

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— increased motivation, loyalty, and productivity; reduced absenteeism and turnover; less need for office space and equipment; and—often the principle motivating factor—easier, cheaper compliance with applicable air quality standards.

But telecommuting is no longer experimental. A million or more employees do it every day, as many as six and a half million in all. So try to view any problems not as insurmountable obstacles, but as wrinkles and bugs that have to be worked out of a new system before it functions optimally.

Even when hundreds of employees are telecommuting smoothly and productively, however, it's wise to keep evaluating the program. A good idea is to publish a monthly newsletter for telecommuters and interested candidates. In the newsletter, you can discuss issues of importance and ask for complaints, problems, and success stories.

You can use the newsletter to uncover any pockets of employees who are disgruntled, or who are having problems with telecommuting. And you can use it as a survey form to collect data for comparison with base-line data from employees' original applications about their pre-telecommuting days. Most such surveys find that telecommuters are more satisfied, more productive, and more loyal to a company once it lets them telecommute. ■

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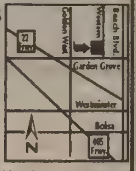

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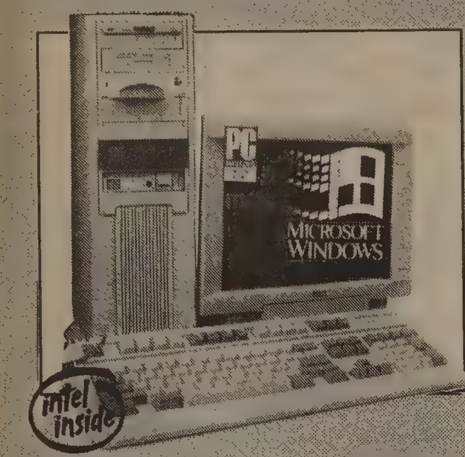

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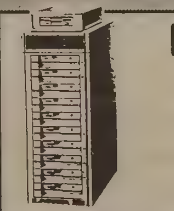

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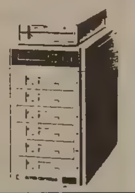

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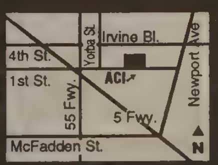

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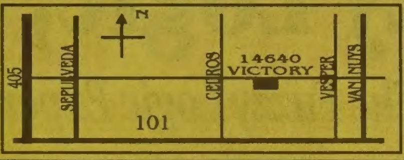

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After Fuzzy Logic, What Next?

A Fuzzy Interview With The Fuzzy Logic Experts

BY JOHN C. DVORAK

DVORAK'S LAST COLUMN

Copyright© 1993 by John C. Dvorak. All rights reserved. John C. Dvorak graduated from the University of California. He is a contributing editor of PC Magazine *and* MacUser, *and is considered by many to epitomize the contrarian view of things—a charge that he vehemently denies. Dvorak's motto is: If you have nothing nice to say, then don't say anything at all.*

Paul Freiberger is a local writer best known for his work at *Infoworld*, the defunct *Popular Computing*, and then the *SF Examiner*. His most famous book, until now, was *Fire in the Valley*, a history of the personal computer that has been used as a source for more than a few other books. He quit the *Examiner* recently to work for Paul Allen's foundation or something. I haven't a clue what he does there. Paul Allen is cofounder of Microsoft and worth a few billion.

Freiberger has been pestering me to plug his new book, *Fuzzy Logic* (Simon & Schuster, 1993) by Daniel McNeill and Paul Freiberger. It tells the story of an idea we invented and the Japanese are taking to the bank. Sounds familiar, right? But this case is different from the VCR and the flat panel display, because we didn't even want fuzzy logic.

I already interviewed Paul on my KALW show *Software/Hardtalk*, but Paul feels so fierce about his message that he badgered me into doing this fake interview with him and McNeill about *Fuzzy Logic*. It's like one of those fake generic interviews that radio DJs do on the air when they interview some celebrity whose voice is actually recorded on tape. The questions are written by the interviewees. You read a script as the recording plays. If you miss a line it can sound pretty ridiculous.

Even though Paul has never done me any favors, I still like the guy and agreed to do it—for America! To make it interesting I've categorized the phony questions I'm asking Paul and Dan so you can see how these things are structured.

Here it is, the interview with authors Daniel McNeill (DM) and Paul Freiberger (PF) about the book *Fuzzy Logic*.

First Question: Big, fat, slow pitch, designed to be hit out of the park. The typical dopey first question.

JD: Why do some Americans still resist all these smart fuzzy products? Are we just stupid?

DM *[laughs]*: A big problem is the name. A name makes an argument. For instance, artificial intelligence argues "brains in a box," "twenty-third century," "wonders beyond belief." It's hard to attack these things. "Fuzzy logic" says "fog machine." It invites attack.

The classic follow-up asking for clarification.

JD: You aren't saying that scientists are fighting it because of the name?

PF: Yes. That's part of it. If we'd called it "anti-fuzzy logic" a much more accurate name, by the way, we'd have these smart appliances here today. How could anyone oppose "anti-fuzzy logic"?

DM: There's a flip side to this too. Because of the name, fuzzy logic has come under the harshest scrutiny. So it's like the old saw: "With a name like fuzzy logic, it's got to be good."

The open-ended question. Look at how, although Freiberger wrote the question, he leads off with an answer to something completely different.

JD: What makes fuzzy logic so useful?

PF: Fuzzy logic isn't logic that's fuzzy. It's logic that describes and tames fuzziness. It lets us work with vagueness. Vagueness has always been a great enemy of clear thought. But what have we done about it? We've just sat around and hated it. Fuzzy logic takes a know-thy-enemy approach. For the first time, it lets us understand vagueness, and once we understand it, we can use it. And it turns out to be a very powerful tool.

Here's a beaut. In reality, I'd be snoozing.

JD: How come?

DM: We all think in vague or fuzzy terms. We use words like "hot" or "big" or "slowly," and in fact we make important and usually correct decisions with them. Fuzzy logic uses the same terms. It lets machines think like people.

Check out this next one: Classic self-deprecating yuk-yuk-duh dopey interviewer question. Really lame.

JD: I'm not sure I want my washing machine to think too much like me. It might take over my column.

PF *[laughs]*: What's wrong with that? You could spend your days at the beach and let your washing machine crank this thing out.

Interviewees love compliments.

JD: An excellent point. How do I get one?

DM: You board a jumbo jet, cross the Pacific, and walk into almost any department store in Japan. You can't buy one here.

On to the lame analogy. Of course, it's the interviewer who is the one forced to look lame.

JD: It sounds like trying to buy a pen computer in Angola.

PF: Sort of, yes. But we've been almost willfully blind to fuzzy logic. In our book we point out how the Japanese are using it every day in refrigerators, subways, microwaves, vacuum cleaners, expert systems, and on and on and on. Then an American reviewer reads our book and calls fuzzy logic "potentially useful."

More compliments for the interviewee follow next. This is beginning to sound like a "Hollywood Moment!"

JD: With that kind of shrewd analysis, the Japanese are really in trouble.

DM [*laughs*]: Right. It's like calling the VCR "potentially useful."

Here comes another softball.

JD: What's wrong with these guys?

DM: For one thing, fuzzy logic overturns a 2300-year-old tradition of thinking about logic. Ever since Aristotle, we've viewed statements as black/white, on/off, true/false. Fuzzy logic says statements can be partly true, partly false. Of course, everybody knows statements can be partly true. But some scientists get very upset about this "partly true." You wouldn't believe it. They say it could bring down the house of science.

Here I'm supposed to be incredulous. Sheesh.

JD: Really?

PF: Yes. And there's another obstacle. Traditional AI has become very entrenched in this country. We've spent billions of dollars—some say as much as $100 billion—on it, and what has it brought us? You don't see AI products in the shopping center, or the home, or the office, or the automobile. We've spent almost nothing on fuzzy logic, and it's everywhere. Old AI is bulky and complex, but fuzzy logic is so easy that even some lay people can use it. This is all very threatening to many established careers.

The writers keep asking themselves these stock questions—all softballs until the end when we come to the final question. Now it's time to fall all over myself when I close on an upbeat note.

JD: Well, thanks. It's been fascinating. Your book *Fuzzy Logic* is amazing, and I hope everyone in America buys a copy.

DM/PF: Thank you.

Now the challenge is to find a copy of the book! ■

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Safe Memory Management Keeps Your System Running Smoothly.

What's more annoying than losing work on your PC? A crash or 'hang' destroys everything you've done since the last time you saved. That work is lost forever.

Two major causes of crashes are memory conflicts and running out of memory. To avoid these problems, many users sacrifice productivity-enhancing TSRs or useful network utilities. And that's unfortunate, because the right memory management lets you have it all—safety and performance.

Have Your Cake and Eat it, Too.

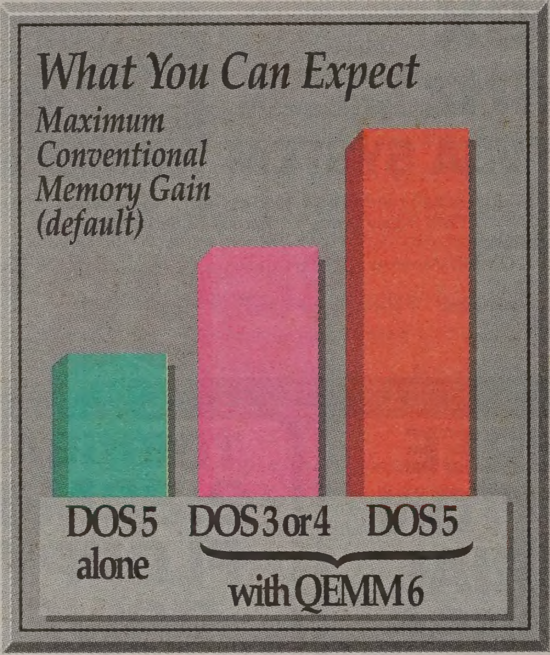
QEMM-386™ version 6 lets you run your favorite programs *and* TSRs without fear of 'out of memory' problems or conflicts. It provides the maximum memory right where your programs need it.

The more memory you have, the more reliability you get. No other memory manager measures up to QEMM's performance.

PC Week Ratings	All Charge 386 3.2	Netroom 2.10	QMAPS 2.0	386Max/ BlueMax 6.00	QEMM 6.01 Analyst's Choice	Memory Commander 2.1
Software Compatibility	◒	●	○	◒	●	◒
Hardware Compatibility	◒	●	◒	◒	●	◒
Reliability	○	◒	○	◒	●	○
Ease of Use	◒	●	◒	●	●	◒
Memory Management Flexibility	◒	●	◒	●	●	◒
Quality of Documentation	◒	◒	◒	●	◒	◒

● GOOD ◒ SATISFACTORY ○ NEEDS IMPROVEMENT

PC Week carefully compared them all and rated QEMM-386 v6 the best memory manager.



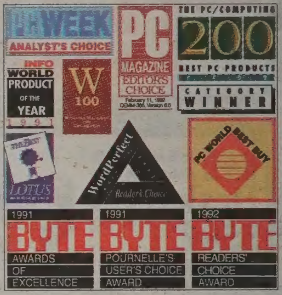
This is what QEMM-386 does for a typical PC. It reorganizes memory to produce greater speed and safety.

Nobody Knows Memory Like We Know Memory.

That's not bragging, just fact. As recently as two years ago, DOS ignored the importance of maximizing conventional memory. At that time, our QEMM-386 v5 provided up to 128K more usable memory. QEMM became a virtual necessity for 'power users.'

Today, our latest QEMM-386 version 6 surpasses even that achievement. Thanks to our new, smart 'stealth' technology, it finds as much as 96K more high memory than other memory managers. And speaking of other memory managers, not one has yet been able to match our performance. Instead, some have slashed prices or started nasty rumors just because they couldn't reliably deliver the same results. These tactics must not work, since we continue to outsell all the others put together.

QEMM. The Memory Manager Millions Rely on Every Day.



QEMM has won more recognition than all other memory managers combined.

Considering its unsurpassed performance and the safety it adds to your system, it's no wonder that millions of PC owners use QEMM. And it should be no surprise that 'gurus' and MIS managers consistently vote QEMM-386 the top memory manager in poll after poll, year after year.

Protect Your Productivity; Keep Your Work Safe.

Any task, from programming to writing the company business plan to composing a personal letter, takes time and thought. Your PC is supposed to make that process easier; your output better. When you can't run your favorite grammar-checking TSR or have to get by without a vital network utility, you're sacrificing productivity.

Whether you're running MS-DOS, IBM™ PC-DOS, DR DOS or MS Windows, don't sacrifice; don't compromise; don't risk losing work. QEMM-386 version 6 is the most powerful, flexible memory manager you can buy. Period.

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